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EKO: ECONOMICS AND ORGANIZATION
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No 11, November 1984

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26 February 1985

USSR REPORT ECONOMIC AFFAIRS

EKO: ECONOMICS AND ORGANIZATION OF INDUSTRIAL PRODUCTION

No 11, November 1984

Except where indicated otherwise in the table of contents the following is a complete translation of the Russian-language monthly journal EKONOMIKA I ORGANIZATSIYA PROMYSHLENNOGO PROIZVODSTVA published in Novosibirsk.

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TARGET-PROGRAM PLANNING AT ENTERPRISES SURVEYED

Novosibirsk EKONOMIKA I ORGANIZATSIYA PROMYSHLENNOGO PROIZVODSTVA (EKO) in Russian No 11, Nov 84 pp 3-4

[Introduction to articles that follow]

[Text] A key problem in the development of the country's national economy is to increase effectiveness and change over to intensive methods of management. Particular measures which are applied frequently in the economic activity of associations and enterprises and in the management of these on the part of the higher organizations are not producing the desired results.

It is necessary to take a comprehensive approach to solving problems that are bothering industrial leaders today. And this was confirmed once again by an experiment in management consulting which was conducted in the Pavlodarskiy Traktorny Zavod imeni V. I. Lenin Association.

We have already written in our magazine about the work of the brigade of experts in the Oktyubrentgen Association and other attempts at consulting in the country, but what was done in Pavlodar was essentially different from them. For they used as an object the largest machine-building enterprise in Kazakhstan. Several tens of thousands of DT-75M Kazakhstan tractors come from its conveyors in a year. The association makes a significant contribution to the republic agroindustrial complex, delivering tractors for agricultural and road construction work, and it produces various kinds of consumer goods.

The tractor construction association is an organic part of the Pavlodar-Ekibastuz territorial production complex which is being formed, where many branches of industry are being developed rapidly. And even against this background the association is a large and complicated collective. The large tasks which are facing it also entail a great deal of responsibility. For a number of years the tractor builders have been experiencing considerable difficulties. How should their work be arranged? How can the tractor be improved so that the demand for the machines that are produced will increase?

Managers of the association and its collective have long been trying to find answers to these questions. The machine builders consider the existing approach to solving these problems to be the main reason for the

unsatisfactory state of affairs, although attempts have been made to correct individual aspects of the enterprise's vital activity.

Consultants have suggested developing four basic comprehensive programs. By applying them in practice it is possible to achieve a more harmonious combination of the interests of the national economy as a whole and those of the association. At the same time three more programs have been developed, which provide for implementation of the basic programs. All of them have set clear-cut goals for the association, and the main thing is that they are realistic and the ways of achieving them have been revealed during the course of management consulting.

The selection of materials published below describe certain results of the work that has been done. With this selection we are instituting a new rubric in the magazine--"management consulting."

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ASSOCIATION DIRECTOR DESCRIBES CONSULTING RESULTS

Novosibirsk EKONOMIKA I ORGANIZATSIYA PROMYSHLENNOGO PROIZVODSTVA (EKO) in Russian No 11, Nov 84 pp 5-13

[Article by Yu. A. Luzyanin, general director of the Pavlodarskiy Traktornyy Zavod imeni V. I. Lenin Production Association: "What Consulting Gave Us"]

[Text] I do not think that we caused any harm to the enterprise's prestige by calling in consultants. Should we be afraid that they will find negative aspects of our activity and tell the whole world about them? But have not previous commissions, which reported their conclusions to the management, not found any? It is useful to discover shortcomings if there are intentions of rectifying them.

It was suggested that we figure out the average of how many various commissions are in the PO PTZ each day checking on its activity. We looked into it and found that there were more than 10. It is the right time to introduce the position "deputy director for external relations" who would be responsible for communications with agencies and organizations. Of course, there is no reason to complain about this: there are only a couple of dozen inspectors for a collective of more than 20,000 people....

Why did I begin the discussion with the commission? Because if you can say that this is what the consultants from the Institute of Economics and Organization of Industrial Production of the Siberian Branch of the USSR Academy of Sciences are, then this could be called a special or even an "extraordinary" commission. In the first place, it does not inspect, although the diagnostic investigations, questionnaires and interviews conducted by the consultants were the most exhaustive and revealed all aspects of our life. It could not have been otherwise: a doctor who wishes to help a patient needs to know when and why he has been ill previously. It must be added that among the consultants there were specialists from the most various spheres--from planning to health protection, and this means that nothing in the life of the enterprise went without attention.

We ourselves invited the scientists and practical specialists for consultation. Why? First and foremost, because everything is clearer from the outside. Although there are some people in the association who have asserted that we know our own "defects" better than someone from the outside

and we can cope with them through our own efforts. Communication with the consultants prove the opposite. This made it possible for us to look at ourselves through somewhat different eyes.

Today an avalanche of information is coming down upon us and it is simply impossible to process it all. This includes various kinds of information. In the areas of management and economics it is sometimes contradictory, which can be seen from the analysis of the orders and instructions that have been adopted at various levels. Who is capable of singling out the most valuable parts? The branch agencies are far away, our own scientific research base is small, and the specialists are overloaded with their own current work. In this respect the consultants are extremely handy.

A group of consultants is not just a sum of "libraries" of information regarding various problems. Rather, it is not a simple sum. It is all a matter of synthesizing individual suggestions and recommendations that have been given to us during the course of the consultation. This synthesis consists in something we have not achieved yet--a systematic approach. At a large enterprise there can be no more dangerous reasons for failures than uncoordinated actions. The equipment can be modern, the personnel can be highly skilled, and the conditions for labor and life can be satisfactory, but the production will not be very effective, the moral and psychological climate will be unfavorable and the overall indicators will be low because there is no strategy, no comprehensiveness, no sequence, no direction of the actions of each and every individual toward consistently constructed general tasks.

There is no need to give examples of the lack of a systematic approach in our association. Suffice it to recall, for example, for the plant for producing instruments and fittings flourished because it utilized the gross indicators which were convenient for it, but the main production suffered because there was no orientation toward the final result. And the instrument production turned out to be dispersed among the shops and did not fulfill its role. Or, when there was a critical shortage of personnel and we were afraid of losing labor force, we reduced our demands made on the people, which inevitably led to an even greater shortage.

A systematic approach was "planted" on our soil by consultants from Novosibirsk and other cities of the country. The end of the "harvest" is still far away, but we do have target comprehensive programs. Their common connection can be defined by one word--effectiveness. It is the inadequate effectiveness of production and management that constitutes the main problem which must be solved through systematic efforts. And the general goal is to raise the effectiveness on the basis of the application of intensive methods of management, scientific and technical progress, and ideological and educational work.

The comprehensive program for development (KPR) of the association includes seven programs: "Quality," "Rhythm," "Social," "Profitability," "Auxiliary Production," "Accounting-Analysis-Control" and "Regulation," and also "Ideology." The first four are the main ones. Their implementation serves for an organic combination of the interests of the national economy and the association. It was no accident that improving quality was named as the

primary task--and a systematic approach requires a clear-cut establishment of priorities. All of the party decisions of recent years oriented us toward this. It has been repeatedly emphasized that the implementation of the Food Program depends largely on the quality characteristics of the tractors.

Today we still have to produce the outdated DT-75M Kazakhstan tractor. In the summer of 1981 we turned to the Altay motor builders, the suppliers of transmissions from the Omsk Sibzavod, with an appeal to work jointly to provide high-quality machines for the workers of our fields. Our associates responded to this appeal, and in particular they are conducting work for increasing the life of the engine and transmission before the first capital repair to 8,000 hours. These same consultants helped us again to evaluate the economic, organizational, management and even psychological aspects of our interrelations with our suppliers. They clearly showed us that the general direction of our efforts and our strategy for the future should be a changeover to a more progressive model of tractor which surpasses the best foreign models.

How do we envision the new machine? It is a tractor with a new surface construction, that is, a new cab, wings, sides and hood, with a forced system for lubricating the transmission, and with a thick lubricant--Litol-24 instead of the liquid lubricant, and fewer lubrication points. The working conditions for the tractor operator will improve, the service life of the components and the tractor as a whole will be increased, and the technical servicing will be less labor-intensive. The consumers will be glad to acquire such a machine and it will also be easier to produce.

We in the association have been surprised many times by the suggestions of the consultants. The fact is that the concept "measure" figures greatly in the development of programs. "But are we not developing measures?"--the production workers asked. We are developing them, but here is the rub: unless they are a part of a unified system they do not produce the desired effect, and sometimes they contradict one another. Thus some of them not only do not have to be carried out, but they must be "curtailed" as quickly as possible in order to avoid the undesirable consequences. The target-program approach is something quite different. Problems are revealed for the first time in it, they are ordered, and then a system of measures is constructed for solving them in the form of a tree of goals. The measures are thus coordinated with one another both along the horizontal and along the vertical.

But impediments in fulfilling program measures can become traditional if the systematic approach is carried out only within the framework of the enterprise. This has been noted in the association as well. The chief of the Steel Smelting Plant No 2, B. D. Solov'yev, expressed this idea thus: "A detailed familiarity with the programs 'Rhythm' and 'Profitability' convinced me that there would undoubtedly be positive results. But a doubt arises when for individual measures there is no supply of resources, a situation to which we have already become accustomed." And if some subdivision operates in the old way, it turns out that we are not able to get beyond the starting point: the material and technical supply service begins to talk about its difficulties, the division for labor and wages tries to justify its problems, and the designers and technologists engage in their own problems.

The consultants, incidentally, have made an attempt to demonstrate the target-program approach "in operation" using the example of the M-6 shop. The object was convenient for the development of a program: the shop had received an assignment of sharply increasing the output of consumer goods. How was this goal to be achieved? Obviously it was necessary to coordinate the actions of the representatives of the services that were involved in carrying out the assignments--of the head designer, the head technologist, the planners, the labor specialists, the personnel workers, the supply workers, the legal experts and so forth. The systematic approach was originated with labor. Initially the specialists simply enumerated the official responsibilities of their colleagues: the supply workers were to provide something, the personnel department--was to provide the labor force with the required qualifications, the repair and mechanics shop--was to repair the equipment, and so forth, and we are already carrying out our responsibilities. Only gradually did they come to understand the need to work under a unified program and not demand: you repair, you give, and then I will do....

Not everyone in the association has preferred or does prefer the new methods. The force of habit has had its effect, as has the fear of "making blunders." But during the course of contacts with the consultants, the attitude of many workers began to change in favor of the target-program approach. An important turning point was introduced by the business game which was conducted by the consultant V. F. Komarov. People are gradually adapting to the new method. Let everyone first include his own understanding in it, but the main thing is that they are oriented toward it and speak in its terms. Now the phrases "tree of problems" and "tree of goals" can be heard in various conferences. The programs are being considered at meetings of the party and economic aktiv.

What have we actually received from the group of consultants? On a solid basis and taking into account the specifics of the association, they have defined a clear-cut methodological approach to considering all of our problems and finding measures for eliminating them. Then the group of consultants was able to single out the key levers for improving the work of the association without turning to costly measures, and its suggested ways of eliminating difficulties without special expenditures.

The initial fears that it would all amount to irregular visits and recommendations and that everything else would remain the same were not confirmed. Because of the mutual interest, a plan of joint actions was originated, and it is being realized.

During the years of the 11th Five-Year Plan the production volume increased by 18.4 percent, product sales--by 10.3 percent, and products produced in excess of the plan--by approximately 5 million rubles' worth. The output of tractors increased by 5.8 percent, and we are convinced that we will be able to increase it even more in the future. The Kazakhstan has crossed the borders of our country and is now in operation on the fields of Bulgaria, Vietnam, Cuba, Poland, Czechoslovakia and the African countries.

During past years a good deal of work has been done to increase the output and the list of spare parts. The volume of output has increased by 34 percent,

including 14 percent for export. During 1983 1 million rubles' worth of spare parts were produced in excess of the plan, and a special list of products was delivered early. During the first 3 years of the five-year plan the production of consumer goods increased by 69 percent (in retail prices). For the first time one of the modifications of the tractor was placed in the highest quality category. Our main conveyor is now operating more rhythmically. The sociopsychological situation in the collective has become less tense.

Such are some of the results which have been achieved with a quite definite share of the credit going to the association's consulting assistants.

Table 1. Results of Implementation of Program "Rhythm"

	<u>Average for</u> <u>1979-1981</u>	<u>1982</u>	<u>Increase Com-</u> <u>pared to 1981</u>	<u>1983</u>	<u>Increase Com-</u> <u>pared to 1982</u>
Fulfillment of plan for commercial output (in whole- sale prices), %	101	101	99.1	100	104.2
Tractors, %	98	100	96.8	100	102.8
Spare parts, %	78	101	119.3	104	109.4
Proportion of commercial output, %					
During 1st 10 day	12	17		22	
During 2nd 10 days	28	31		30	
During 3rd 10 days	60	52		48	

Table 2. Results of Implementation of Program "Quality"

	<u>Average for</u> <u>1979-1981</u>	<u>1982</u>	<u>1983</u>
Output of products with State Emblem of Quality	0	0	4.8
Return of tractors by Goskomsel'khoztekhnika receiving office for finishing work, % of those submitted	11	11	9
Complaints, units	43	25	19
Percent of output	0.09	0.05	0.04
Losses from defective work, thousands of rubles	2929	2773	2623
Percent of production cost	0.98	0.81	0.74
Percent of average for 1979-1981	100	94.7	89.6

Table 3. Results of Implementation of Social Program

	Average for <u>1979-1981</u>	<u>1982</u>	<u>1983</u>
Overall labor turnover	26	22	19.5
Turnover of workers	28	23	19.4

Table 4. Results of Implementation of Program "Profitability"

	Average for <u>1979-1981</u>	<u>1982</u>	<u>1983</u>
Profit (+), losses (-), millions of rubles	-45	+9.7	+10.6
Expenditures per 1 ruble of commercial output, kopecks	117.6	96.52	96.35
Increase in output per 1 workers, %	1.6	2.5	5.1

From Letters

In my opinion, consulting is especially useful for those managers who maintain an authoritarian style of management.

K. Ye. Burbalo,
Head Engineer of the VNIIM imeni D. I. Mendeleyev,
Leningrad

My colleagues think that the development of the work of consultants in all branches of the national economy is an important direction for increasing production effectiveness.

M. V. Radiyevskiy,
Candidate of Economic Sciences,
Docent of the Institute of the National Economy,
Minsk

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CONSULTANTS HELP IN CHANGING MANAGEMENT STRUCTURE

Novosibirsk EKONOMIKA I ORGANIZATSIYA PROMYSHLENNOGO PROIZVODSTVA (EKO) in Russian No 11, Nov 84 pp 14-19

[Article by V. D. Rechin, candidate of economic sciences, Institute of Economics and Organization of Industrial Production of the Siberian Branch of the USSR Academy of Sciences: "Equal Partnership"]

[Text] Not every manager will dare to change the existing system of management. A person who has made such a decision understands that he cannot do without all possible support and assistance. The first assistants in this complicated matter can be the consultants.

Consultants too must decide upon this step, and once they have decided they must not forget that their recommendations will be accepted by the client only when they are supported by his own conclusions. And here one cannot do without submitting a report to the client, even if there is mutual respect and confidence among the parties. Long-term creative contacts are needed.

In the PO PTZ they managed to meet these conditions. The workers and the consultants equally became authors of the comprehensive program for the association's development. Even during the preparation of the agreement for cooperation at the end of 1981 and all the time in between, the managers of the association candidly pointed out the shortcomings as they saw them and offered statistical material with the results of special investigations that had been conducted in the collective. In turn, the consultants shared their impressions and suggestions as well as their first recommendations which were still not well-substantiated.

In particular, at the request of the consultants, 27 higher managers wrote analytical notes about the main problems of the association. Many of them then recognized that this had been difficult for them but very useful: they themselves came to certain practical conclusions. The most complete opinion of the collective concerning the main factors in the unsatisfactory situation was obtained with the help of questionnaires. Responses were given by more than 1,300 workers, 240 foremen and shop chiefs and about 600 other workers--shop chiefs, division chiefs, rank-and-file engineers, and so forth. Practically all of the association's collective became familiar with the

results--through the local newspaper and discussions in the shops and divisions.

They not only revealed the reasons for the difficulties, but also searched for new ways of resolving them. The idea of a comprehensive program for development (KPR) originated in a joint search. It was registered as the main recommendation of the intermediate report. Moreover, requirements were formulated for four target and three supporting programs (right down to listing the most important measures), and special requirements for the KPR were indicated.

It is not a simple matter to staff a brigade of experts. It is necessary to form a group of specialists which is capable of consulting on practically all of the main problems related to management of the enterprise. There is hardly an organization in the country which is capable of rendering comprehensive assistance with its own workers alone. The Institute of Economics and Organization of Industrial Production of the Siberian Branch of the USSR Academy of Sciences, in addition to its own 23 workers, has invited 18 more people to participate in this work: from other scientific organizations, primarily the Ministry of Agricultural Machine Building, and also from the leading enterprises of the country--ZIL, KamAZ, the Chelyabinsk Tractor Plant, Uralelektrotiyazhmash, Novosibirsk enterprises and others. Because of this composition of the consulting group it has turned out to be possible to help the PTZ both in the area of methodology (above all in constructing trees of goals and problems and mastering other problems of the target-program management) and in the development of measures for improving individual aspects of the management of the association. Each program manager and many managers of subprograms have received their own consultants.

When the intermediate report was submitted to the association with initial recommendations from the consultation group, the managers of the association were already well-prepared for drawing many conclusions.

All the main proposals of the consulting group, which were contained in the intermediate report, were accepted by the management of the association. The report was received by all who had been enlisted in the development of the KPR PO PTZ (more than 100 people). The association's general director, Yu. A. Luzyanin, issued an order which appointed the managers of the programs, their deputies and the numbers of the councils (staffs) of the programs. The target programs were headed by deputies of the general director.

The groups of consultants came to Pavlodar each month. During the course of a week, in conjunction with the specialists of the PO PTZ, they developed the programs: they drew up the trees of problems and the trees of goals, and, in brief, they helped to assimilate the target-program approach. During this period the consultants gave a cycle of lectures. As the clients themselves stated later, they received the greatest advantage from the work of the so-called small groups: one-two consultants and five-10 association workers.

It is no accident that the development of the programs advanced when the consultants were present in the association and "cracked the whip." But by

the same taken the entire stage of drawing up the programs could not but be prolonged.

The development (including studying the reports, hearing the lectures and so forth) drew the managers of the PO PTZ away from operational matters, of which there are especially many during the summer months. But they passed the examination for reorganization of management, having sharply reduced the organizational part of it. And, judging from the results (the fulfillment of planned assignments in the summer of 1982 was better than in preceding years), one can become convinced that this restructuring was useful.

The first variants of all seven programs were completed and discussed at a joint meeting of the council for KPR PO PTZ (headed by the general director, Yu. A. Luzyanin) and the consultation group (headed by Academician A. G. Aganbegyan). It became clear that in terms of the completeness and depth of the development, individual programs differed essentially. It was recommended that the program "quality" (manager--head engineer of the PO PTZ, V. T. Chava) be the first to brought up for the consideration of the party-economic aktiv. It was accepted in November 1982. The program entitled "Social" (manager--deputy general director for personnel, Ye. A. Andriyannikov) was the last to be approved, in May 1983 (also after discussion by the aktiv). The programs and the measures they envision assume the nature of directive documents.

The association's initiative was supported both by the management of the ministry and by local party organizations. In October 1983 in Pavlodar they held an all-union conference on the application of the target-program approach in the management of industrial enterprises (associations). From experiments in management consulting which were carried out under the leadership of the IEiOPP (including assistance from the Oktyubrentgen Production Association) it is possible to draw certain conclusions of a methodological and organizational nature.

Of decisive significance for success in consulting is an understanding that this is joint work, with the leading role being played by the clients--the managers of the association. Their activity, interest and readiness for change predetermine the success of the entire matter.

The greatest results were achieved in those programs where the managers created working groups (staffs) comprising qualified specialists and provided them with conditions for working, in particular, relieving them of their ordinary duties for from 1-3 months.

It is difficult for workers of the enterprise to accept recommendations not only (and not so much) because they have to master new methodological devices (the construction of trees of goals, network schedules and so forth) as because this touches upon their interests: even the very drawing up of the programs, not to mentioned their implementation, changes certain things, and sometimes essentially, in the existing system of management and the position of individual managers in it. But this work in the final analysis involves the interests of the entire collective, which should know from the very beginning that its opinion is taken into account in the programs. In view of this, in particular, at the beginning of the consultative assistance a

questionnaire was conducted at the PO PTZ. But a questionnaire alone, of course, is not sufficient for the association's party organization to understand well from the very beginning and help enlist the broadest group of workers and also supervise the development of all programs.

One must say that not everything that was recommended by the consulting group, including regarding the methods of drawing up programs and supervising their implementation, was carried out. On the one hand, some of the recommendations were not sufficiently substantiated and not all of the methodological issues were well thought out. On the other hand, the production workers prolonged the development of programs (dealing with this matter mainly when the consultants came to them (and took a simplified variant of their preparation-- just so long as the introduction could be started more quickly. This could not but affect the effectiveness of the entire KPR PTZ.

When thinking about the scientific and practical experiment in this association one should note that management consulting is a process, and its main advantage lies precisely in this. The main result here is not the report, even the profoundest one, but the assimilation by production workers of the recommendations in the report (a considerable part of which come from the clients themselves). Because of the constant communication between the consultants and the clients, regular feedback is maintained among them, and this is a necessary condition for the effectiveness of any activity. Managers of the association feel for a long time the direct support of the consultants in the changes that they have initiated. An important aspect is confidence in the consultant and in his experience and knowledge.

The recommendations should be based not only on objective analysis, but also on the peculiarities of the perception of those whom they address. Our experience shows that a great deal of patience is required from the consultant. One of the reasons for the low efficiency factor of many scientific research projects under economic contracts lies in the fact that they usually end with a report from the person in charge of the work in the council or the submission of a report, while this should be while not the beginning of the work, at best the middle of it. The deeper the recommendations, the more serious the proposed restructuring of the system of management, and the more difficult it is for the client to accept these recommendations.

Thus at the PTZ the main thing was not the final report, which was submitted to the association at the beginning of 1983, but the intermediate one, which it received in May of 1982. On the basis of this the plant workers and their consulting assistants did all the basic work for drawing up the programs.

After a week of joint work for drawing up the trees of goals, when asked whether or not there was something still incomprehensible in the methodology of their construction, the plant workers responded that everything was clear. But 20 days later when they began to consider together how to complete the construction of the trees it turned out that they had understood the most basic thing incorrectly. And this was the case with all seven programs. Who was to blame? Nobody. This is normal, and this is the way it was supposed to happen. One cannot master such a complicated matter in one visit, regardless

of the capabilities of the teachers and the students. It was necessary to repeat the procedure again and again. And as was already noted, even then they did not manage to bring everything in line with the requirements of the theory.

The methodology of management consulting is not described in foreign publications--apparently because it is a "company secret." And we do not describe it either--we do not have enough practical experience. And even we cannot say that we have mastered this methodology. But apparently certain of our conclusions can lie at the basis of its collective development.

The consultant has at his disposal only one method of interrelations with the client--the method of persuasion. But he must take full advantage of this. Among his instruments, in particular, is demonstration by example. On the advice of consultants, several groups of managers of the PTZ visited a number of leading enterprises (KamAZ, Oktyubrentgen and the best Novosibirsk enterprises). There they were able to see in practice the administrative innovations that had been recommended for their association.

Between enterprises, on the one hand, and scientific organizations and VUZes, on the other, ties were established for solving problems of improving management, mainly on the basis of economic agreements. There is no doubt that a need for such ties exists. One can also judge this from the large number of requests for consultative assistance which have come to our institute from enterprise directors in various cities of the country.

One can assert that management consulting is called upon not only to advance the art of administration, but also to increase the effectiveness of ties between science and production.

"To convince and ensure real results!"--this is the motto I see for the incipient area of activity--management consulting.

From Letters

We all need a consultant since it is difficult for us ourselves to change all that is familiar and established. And sometimes we are even afraid to.

B. I. Betsnel',
Riga

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QUALITY SECTION OF COMPREHENSIVE PROGRAM DESCRIBED

Novosibirsk EKONOMIKA I ORGANIZATSIYA PROMYSHLENNOGO PROIZVODSTVA (EKO) in Russian No 11, Nov 84 pp 20-25

[Article by V. T. Chava, head engineer of the PO PTZ, and A. A. Avakyan, candidate of economic sciences (Krasnoyarsk): "The Goal--A Better Machine"]

[Text] The problem of improving the quality of the association's products is obvious if one is familiar with the data concerning the return of products, complaints and losses from defective work. The figures for these indicators have not decreased from year to year. Of course the engineering services have made efforts to solve this problem, but it is difficult for them to break away from current matters. But the group of consultants forced us to stop, look around and think about the problems we must solve, taking advantage of all existing means and relying on the theory of management. Many specialists will not go this far even in their spare time. Here is where we see the main effect and the main advantage from consultation work.

Reference Point--Final Result

The consultants and those receiving the consultation had to solve the following problems: analysis of product quality in the stages of its creation, manufacture and operation; development of working hypotheses; and preparation of recommendations. Evaluations made by specialists of the association regarding a previously determined group of issues, documentary information and direct observations proved to be useful. Interviews were conducted with the head and leading specialists of the service of the head engineer and "round table" meetings were conducted with the participants of their associates, and documentary and statistical data were also gathered.

We worked long and painstakingly on the program entitled "quality." And we did not become bogged down, as usual, in "trivia," but kept our eye on the final result. Perhaps for the first time since the association has been producing the DT-75M Kazakhstan tractor, we managed to analyze fully enough the state of affairs with respect to improving its quality, and to formulate clearly what has to be done.

As a result of the investigation, the following picture appeared. In the stage of the creation of products, the association did not formulate its own

technical policy regarding the development of new tractors and the modernization of those that are already being produced, and it did not fully take advantage of its rights with respect to the developer organizations and accepted inadequately developed design documentation from the Volgograd Tractor Plant--the head plant for the development of tractor designs and the one that keeps the originals of design documentation. Design organization of the PO PTZ carried out individual assignments for modernizing the tractor and creating its industrial modification on the basis of this same Kazakhstan. There was no plan of work for the future original base model. The documentation that came from the head organization was not checked for its technological characteristics. The metrological and standardization support left something to be desired.

Quality control was oriented almost exclusively toward providing the prepared tractors with the parts which were in short supply, completing the painting, and so forth. Control operations were not always combined with the requirements of technology, which inevitably led to defects, up to 70 percent of which were revealed in the release shop. The gathering and processing of information on quality was not systematic enough. The information contained figures about the quantitative parameters without properly accounting for the effectiveness of production.

The figures concerning losses from defective work included information only about the so-called accounted-for defects, that is, parts and components which were finally rejected and were unsuitable for further use. Expenditures on the return, transportation and correction of items that were rejected were not regarded as losses from defects and were included as production expenditures in the production cost.

The actual expenditures on the operation of the fleet of tractors that were produced considerably exceeded the planned amounts, especially for batching items--for engines and transmissions. During the period of 1979-1981, with an overall 1.8-fold increase in the number of complaints, the complaints which were the fault of the association increased 3.7-fold, those that were the fault of Sibzavod which delivers the transmissions--11.6-fold, and those that were the fault of the Altay motor builders--1.2-fold. Nonetheless there were practically no economic sanctions against the suppliers. Such a situation, of course, could not be satisfactory to the tractor builders.

The comprehensive system for product quality control (KS UKP) which was previously in effect did not produce the expected return. Only 26 of the association's specialists took training in the course entitled "Standardization and Control of Product Quality." This is a very inadequate number for such an enterprise. The selection of standards for the enterprise (STP) was carried out by analogy with other enterprises, and therefore some of the STPs turned out to be irrelevant, and some of them were not taken into account at all. We did not adhere to the principles of comprehensiveness, continuity, mandatoriness or simultaneity of the fulfillment of functions in the KS UKP.

Still the majority of head and leading specialists of the engineering specialists of the engineering services are sufficiently qualified and capable

of carrying out tasks of improving product quality. Consequently, we required not "surgical" measures, but a revision of the strategy and tactics of the engineering services. We drew up and adopted the following recommendations:

to develop a comprehensive target program entitled "Quality," which envisions concentration of efforts and means on the main areas;

to detail the program to the level of the rank-and-file workers;

to determine the priority of goals;

to establish the time periods and sequence of the work by the method of network planning.

Thinking About the Reputation of the Products

At first some of the association's engineers were somewhat perplexed: why have a target program entitled "Quality" when they already have an organizational and technical plan which includes everything and all one has to do is fulfill it? But this perplexity was gradually dispersed. The target-program approach, with all the complexities of its assimilation, makes it possible to facilitate the work a great deal. While in the organizational and technical plan it is difficult to decide on the level of quality which must be reached in the given year, the program clearly defines it. The fulfillment of both the organizational and technical plan and the "Quality" program requires significant expenditures (10-12 million rubles before 1985), but now they are clearly distributed among the various years. While previously the main goals of improving product quality were submerged among the many intermediate and operational goals, now everything has been placed in the service of these main goals. It is intended:

to increase the durability of the tractors with a frame (new) cab;

to raise the technical level of the tractors and to achieve:

a) a reduction of losses from defective work from 2.1 million rubles in 1982 to 1.2 million rubles in 1985;

b) a reduction of the number of complaints in 1985 to approximately two-thirds of the number that existed in 1982;

c) a reduction of the return of the tractors by receiving personnel of Goskomsel'khoztekhnika from 10 percent in 1982 to 6 percent in 1985.

It was necessary to create the KS UKP anew, making it the organizational and methodological base for the implementation of the program, and the subdivisions that engage in standardization had to be combined into a service which is under the jurisdiction of the head engineer.

Other recommendations were accepted for execution:

to develop and introduce a program of input control of batching items, providing stands, equipment and so forth for this;

to alter relations with suppliers, and particularly to increase sanctions taken against them for delivering poor-quality items;

to orient the plans of engineering services toward increasing the reliability of the products. To review the structure of the division of the head designer, having singled out two directions--long-range planning and increased reliability of the models that are produced;

to introduce coordination of NIR and OKR, which are ordered from research and design organizations;

to develop anew the provisions concerning the divisions, services and subdivisions, moral and material incentives, socialist competition; to draw up official instructions that are detailed right down to the description of the procedures;

to introduce KS UKP and experimental research work (EIR) and to begin with a system of defect-free manufacture of products; to plan the KS UKP and EIR themselves as an organic part of the system of management of production, thus eliminating duplication.

It was expected that the economic effect from following the recommendations would increase gradually for 3 years and reach 7-8 million rubles annually. Even more important for the service of the association is improvement of the reputation of its products, the effect from which cannot be expressed in monetary terms.

The Program--The Initial Working Document

There were many problems in implementing the program. Take, for example, the completion of the materials for producing the new cab. It was extremely difficult to obtain the necessary profile of metal, as a result of which it was necessary to change it, or, more precisely, to complicate the production of a large number of parts. A new level of products requires a new level of technology. Now, in particular, we are keenly experiencing the small output of parts by methods of cold pressing--only two workers of the laboratory of the scientific research division are engaged in their assimilation. There is a more critical need for creating a shop for precision casting and sections for casting under pressure and powder metallurgy. In spite of the high provision of the subdivisions with fixed capital, the fulfillment of the "Quality" program requires the acquisition of new equipment, which is very costly today.

The first thing to be done was to organize the working group, premises were allotted for it, and regulations were drawn up. We coordinated the principle of constructing the program on the basis of GOST's for management of the production association and product quality. According to this principle, the entire program was divided up into 18 subprograms which were joined into blocks according to the people responsible for carrying them out. A

"skeleton" plan for the construction of the program, which combined the tree of problems and the tree of goals, was proposed, coordinated, reproduced and distributed to members of the staff and the working group. The people responsible and their assistants were determined for each subprogram. The working group was trained in stages in the technique of constructing the program, and individual and group consultations were conducted simultaneously.

On the whole "Quality" can serve as an initial working document. Its "defense" at the conference, with the participation of the general director, confirmed this opinion. After its "defense," business conferences were conducted with the staff and the working group. At these the program was gone over in detail and recommendations were adopted for eliminating mistakes and organizing the work for its implementation.

The final recommendations pertained mainly to preventive measures:

the fulfillment of the program is controlled in the computer center;

the monthly plans of the engineering services should be drawn up almost exclusively from measures of the program;

the responsibility of the managers of the subprograms and blocks is established for the achievement of goals envisioned by the program, that is, for the final results, and not for formal fulfillment of points and measures;

if the measures have not made it possible to achieve the goals that are set, the manager who included them in the subprogram is responsible for the fact that they are erroneous;

the policy for making changes in the program envisions a clear division of authority as is done when making changes in design documentation;

for each violation of the normal course of the work, including repeated violations, sanctions are envisioned and are approved ahead of time, and they are applied unwaveringly;

a clear policy of coordination with other programs is established, which precludes the possibility of disputes regarding the interpretation of the question of responsibility.

One of the major changes that have taken place as a result of the communication with the consultants is the experimental output of modifications of our base tractor in the association: a new cab, and orientation toward new consumers--road builders. It is difficult for large-series production to assimilate small series of machines, but this is the only solution. It is difficult for large-series production to master small series of machines, but this is the only solution. The association has not been allotted any funds for expansion of the areas, and it does not have so-called transition areas so that it is possible to make engineering preparations for new production, although there is a good experimental shop. We do have the target-program method which makes it possible to utilize resources efficiently.

There are two technological lines on the main conveyor. The consultants suggest organizing two-shift work here instead of three-shift work, the more so since the second line is not fully loaded. On it one could produce new series of machines, for which the plans and the policy for organizing the work have already been drawn up.

But even within the limits of the design of the ordinary Kazakhstan tractor there are many reserves for increasing its reliability and improving its quality characteristics. These include machines that operate on irrigated fields. They are durable and reliable and evoke no complaints from the operators. The experience in working with these machines which we produce shows that a similar tactical goal can be reached in the fulfillment of the program "quality" with other tractors that come from the conveyor as well. And the strategic task of the next few years will be to create experimental models and produce tractors that are the best in their class.

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PROGRAM FOR RHYTHM OF CONVEYORS DESCRIBED

Novosibirsk EKONOMIKA I ORGANIZATSIYA PROMYSHLENNOGO PROIZVODSTVA (EKO) in Russian No 11, Nov 84 pp 26-31

[Article by O. R. Gorte, deputy general director of the PO PTZ for production, and G. V. Grenbek, candidate of economic sciences, Institute of Economics and Organization of Industrial Production of the Siberian Branch of the USSR Academy of Sciences: "How To Achieve Technological Rhythm of Conveyors"]

[Text] Dialogue Between Manager (M) and Consultant (C)

M. Rush work has bothered everyone in the association--both managers and workers--mainly because it disorganizes production. The chronic lack of rhythm, which affects both the quality of the items and labor turnover and labor discipline, has been recognized as the most crucial problem.

C. There has never been any single definition of rhythm among consultants, regardless of what importance it may have had in specialized literature. There is no clear-cut distinction between the concepts of "rhythm" and "uniformity." Behind all this lies something more than simply terminological confusion: frequently incentive indicators are introduced which have no serious substantiation and give the workers an incorrect orientation. Nor have we established ways of measuring rhythm which would reflect both the interests of the national economy as a whole and those of the producers. Of course, when selecting these means of measurement one should be oriented primarily toward the final result.

Our viewpoint is this: production should be uniform, as is dictated by the needs of the national economy and the health of the worker. Flow-line, conveyor production should be rhythmical primarily in the sense of providing for a technological rhythm.

If one is faced with a problem which the production workers perceive as crucial, it is necessary to develop methods of solving it in those same terms in which they see it. It was thought in the association that the lack of rhythm was brought about by external factors and could not be brought under control. The analysis conducted by the consultants showed that the ratio between objective and subjective causes of the lack of uniformity in the work was 20:80, that is, 20 percent of the lack of rhythm on the main conveyor was brought about by objective circumstances, for example, failures to deliver

transmissions and engines, and 80 percent--by the imperfect organization of production and violations of technological discipline. A curious example from the same analysis: on all shifts the maximum output came in the eighth hour of work, when the people were most tired....

The lack of rhythm is explained, in our opinion, by the following factors: incomplete and imperfect production, interruptions in cooperative deliveries when there is a high level of them (64 percent per 1 ruble of commercial output according to the plan as compared to 25 percent at the ChTZ, 42 percent at the KhTZ and 48 percent at the MTZ); the shortage of warehouses and transportation; and shortcomings in administration and communications. The organization of production and management and the conditions for the work of the production units did not correspond fully to the type of production--mass flow-line production; and there remained features which are inherent in the series and even small-series type of production. As a result, the work of the main conveyor was unstable in terms of three basic interconnected characteristics: incomplete feeding of the assembly conveyor; the quality of components and parts that were submitted for assembly; and technological discipline. Such were the "sore spots."

M. We understand the factors in rhythmic operation to be the following: correct organization of labor processes and effective control of them; prompt supply of blanks, parts, assembly units, materials and batching items; reliable operation of the equipment; and continuous supply of the work stations with instruments and fittings of a high quality. All this became the point of departure when developing the program "Rhythm." It recommended singling out four special-purpose subprograms: "Incomplete Production," "Warehouses," "Transportation" and "Organization and Structure of Production," and one support subprogram--"Operational Management of Production." Their goals were, correspondingly, to create stable normative reserves of incomplete production; to bring the warehouse facilities up to the normative or planned capacity and to increase the coefficient of readiness of means of transportation to 98 percent; and to simplify production so as to restructure it for complete utilization of the advantages of the mass type of production.

C. The task of the methodological plan was to help in constructing, for example, a tree of goals, and to divide up the tasks between "Rhythm" and "Quality"--these programs intersected most frequently. So one of the variants for the formation of the program with the help of the tree of goals was to evaluate the technological stages or the chain of related sequential stages of the production subdivisions. Another variant was to break down the major goal into the most important areas of work which the entire association had in common and subsequently to break them down according to the essential indicators of the work in each area. In the program entitled "Rhythm" they took as a basis the structure of the second variant, but when defining the divisions of the program and their content, an expert analysis was conducted for the technological chain--from the release shop to the procurement shop.

Here, for example, are the procedures for breaking down the measures according to the programs "Rhythm" and "Quality." Let us consider the release shop. Its functions are stand testing (running in); elimination of defects that are revealed; repeated external painting ("underpainting"); and presentation to

representatives of Goskomsel'khoshtekhnika for acceptance. The recommended solutions: to equip the stands with the additional devices and gauges for combining the running in with tests under loading and with the registration and accumulation of information (in the "Quality" program); to eliminate repeated painting; to reduce to a minimum or completely eliminate finishing work by eliminating defective components before they arrive for assembly and observing a strict technology for assembly on the main conveyor; to transform the release shop into a section of the assembly shop and to turn it over for accounting and evaluation of the work of the latter upon release of the tractors to the client, and not when they are taken from the main conveyor (program "Rhythm").

M. It must be noted that we have not adopted all of the recommendations of the consultants. In particular, we did not agree to combine the release shop and the assembly shop. We thought that it was sufficient to prohibit accepting incomplete machines from the assembly shop. But we agreed more than we disagreed: in an overall total of 26 blocks of five subprograms and more than 200 measures that are included in them.

C. It is not always suitable for an industrial enterprise to create a "cold" reserve of capacities in the form of free working stations and equipment. Thus the PO PTZ has 38 million rubles' more production capital than does the Minsk Tractor Plant, and it provides 328 million rubles less of sold products. Today production reserves are expressed mainly in the creation of insurance and circulation supplies of materials, semimanufactured products and batching items--incomplete production. Such an approach reduces the dependency of the shops on one another and increases the possibility of uninterrupted operation. And the supplies can be created without increasing the overall volume of normed circulating capital.

When developing differentiated normatives of incomplete production we recommended utilizing for the grouping the NZP method of engineering (or ABC) analysis. Its essence consists in that from a multitude of parts one singles out group A, which is equal to 5-10 percent of the overall number of kinds of parts. This group comprises the largest proportion in terms of expenditures and material-intensiveness--up to approximately 70 percent of the annual circulation of incomplete production. Thus it includes large, material-intensive parts with a high labor-intensiveness of manufacture. Their production should be placed on the flow line and only an insurance supply should be created.

Group B usually contains 15-20 percent of all the kinds of products, and its share in incomplete production is up to 20 percent. These parts are manufactured in large batches, for example, enough for a month, thus forming a circulating reserve and an insurance supply of each (the latter is calculated according to the length of the production cycle).

Finally, group C contains 70-80 percent of the kinds and up to 10 percent of the annual volume of NZP. The parts that are included in it are manufactured in quantities sufficient to satisfy the need for a quarter or for a year.

Such a differentiated approach makes it possible, within the limits of the normative of circulating capital, to create long-term supplies of a large number of parts, to sharply reduce the monthly list of products that are processed and prepared by the shops, and to utilize production capacities more fully because of the minimization of the readjustments of the equipment. The effectiveness of operational planning and management increases significantly.

M. Concentration on the creation of batch NZP within the normative limits has made it possible since October of 1982 to eliminate many bottlenecks in the assembly of the tractor. A pleasant change has taken place. We have begun to depart from managing with a shortage--and we now control the schedule and not the shortage positions. A superfluous link in the structure--the plant for caterpillar tractors which caused us to lose the control of the machine assembly shops--was eliminated, and the production-dispatcher service of the association is under the direct jurisdiction of the machine assembly shop. This recommendation from the consultants coincided with our point of view.

At the beginning of 1983 the association discontinued removing incomplete tractors from the conveyor. To be sure, there are individual cases of this, but only with the permission of the director. For the first time in January of 1983 we reached the normative of incomplete production. It does not yet cover everything.

It is difficult to fight with external suppliers, as they say. Within and between the shops we are capable of coming to agreements. Thus the form of payment for all of the dispatcher personnel was changed. Strange as it may be, the least output of tractors came during the first (day) shift. We began to pay the dispatchers 15 percent of their bonuses which amounted to 40 percent of their wages for precisely this output. Beginning on 1 January 1983, additional material incentives were introduced to stimulate the main shops to maintain rhythmic operation: the metallurgical shops were given bonuses for filling the basic products list, and the machine assembly shops--for meeting the schedule for eight of the main largest and most labor-intensive components (frame, wheels, undercarriage and cab). Approximately 20 percent of the bonus fund went for paying wages on days off. We shall gradually begin to refrain from this as a result of meeting the schedules and condensing the working day.

C. Here are certain of our recommendations. For the PO PTZ it is promising to organize a central unit for operational production control--a shop for complete sets of items which is intended not only for warehousing incomplete production, but also for sending to the work stations complete sets of blanks, parts, assembly units, instruments and fittings. Therefore it is necessary to create a shop for complete sets with sections between the smelting-forging and machine assembly productions and before the head conveyor. The head conveyor should be changed over to two-shift operation of both lines.

We should prohibit changing the plan for the shops during the course of the month and fully coordinate the operational calendar planning with technical and economic planning. For casting and forging shops it is necessary to present the plan in the products list and not in tons, and to award bonuses primarily for fulfillment of the plans in the precise list of products. It

would be possible to begin with bonuses for providing for the planned volumes of production during the first 10 days of the month, and on the main conveyor--for submitting to the next shift production in such a condition that the difference between the output of products during the last hour of the preceding shift and the first hour of the subsequent one will be minimal.

It is necessary to increase the effectiveness of the functioning of the large dispatcher service (there are more than 500 people there), primarily by distributing the responsibility for "their own" shortage and "their own" deviations from the schedules.

We achieved an appreciable effect from implementing the program "Rhythm" soon after it was developed. Suffice it to say that the dispatch of tractors during the first 10 days increased from 12 to 22 percent, and during the second 10-day period--from 28 to 30 percent. But we do not consider this to be the main thing in the cooperation with the consultants.

Uniformity in the work is a serious task which directly influences the effectiveness of all production. But what follows after this is done? Contacts with scientists have taught us always to ask the question: "What next?" It is necessary to work with a smaller number of personnel and with more technology, and to assimilate the planned capacities through increasing the coefficient of shift work. There are many tasks and the "rhythm" program, one might say, has set the direction for envisioning them, approaching them and solving them.

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OPERATION OF SOCIAL PROGRAM DESCRIBED

Novosibirsk EKONOMIKA I ORGANIZATSIYA PROMYSHLENNOGO PROIZVODSTVA (EKO) in Russian No 11, Nov 84 pp 31-36

[Article by Ye. A. Andriyannikov, former deputy general director of the association for personnel, L. S. Korovin, B. P. Kutyrev, candidate of economic sciences, and V. I. Gerchikov, candidate of economic sciences, Institute of Economics and Organization of Industrial Production of the Siberian Branch of the USSR Academy of Sciences: "Diagnosis of Social Health"]

[Text] The development of any program begins with the diagnosis of the problems. We had to evaluate the condition of the organization of labor, the placement and utilization of personnel, and the personnel policy in general, and to determine its "hot spots" and clarify the attitude of the association's workers toward all these problems--both rank-and-file workers and managers of various ranks.

"Brainstorming" at the Repair and Mechanics Plant

The diagnosis was necessary, although it was suggested to us that we become familiar beforehand with the opinions of the managers and the results of research that had been conducted both by the sociological service of the association and by scientific institutions, mainly VUZ institutions as well as service information. The client, naturally, had his own point of view regarding various phenomena and processes in the collective. Their evaluation could only be superficial, and the deep-seated causes of the existing situation were not clear.

We analyzed the data for the past 5-10 years for many subdivisions of the association and conducted interviews with dozens of workers. We conducted a brainstorming session in the repair-mechanics plant, as a result of which we revealed problems as they are seen by the plant collective. Participating in the organization of the brainstorming, in addition to the authors, was V. Sh. Rapoport, the chief of the division for administrative procedures of KamAZ, who previously worked at the PO PTZ.

How was it conducted? A group of managers, including the head engineer, the chief of the technical division, shop chiefs, foremen and brigade leaders (a total of 25 people) were asked to write down the problems that bothered them--

each one on an individual sheet of paper. A problem was defined as a difference between the existing condition and the desired one. It was suggested that they use such key words as "inadequate," "unsatisfactory," "low," "weak," "ineffective," "poor," "superfluous," and so forth. They spent 40 minutes writing the lists, after which they gathered together and refined them, on the spot. Then the consultants tried to construct a tree of problems as it was suggested that the plant workers do. The tree that was constructed was considered at a conference of plant managers.

Parameters of the General Problem

The general diagnosis showed that one of the main reasons for the unsatisfactory work was the lack of a unified, goal-directed policy for the formation, stabilization and development of the social activity of the association's collectives. This was taken as a general social problem. The association ended up in a "vicious circle." The high level of personnel turnover--during the 10 years from 1971 through 1980 three times as many people passed through the PO PTZ as are working there at the present time--forced them to reduce the requirements for the workers they hire, and the acceptance of personnel who are known to be unstable, in turn, causes turnover and increases the danger of a loss of some of the labor force and thus a failure to fulfill the production plans.

During 1975-1981 labor turnover remained within the range of 21-25 percent. In 1981 61.5 percent of the workers were individuals with a length of service (in the association) of less than 3 years. There was a large proportion of people who left their jobs of their own accord: in the casting and forging plant, for example, they comprised 22.3 percent of the overall number of people who left. Because of the shortage of personnel the association accepted people who had previously been fired from it several times, including for violations of labor discipline. Youth within a secondary general and specialized education were sent to jobs with less skilled manual or less mechanized labor, which ended up with their leaving quickly.

The consultants especially noted the frequent replacement of line foremen of shops and sections. The proportion of shop chiefs working in this position for more than 3 years amounted to only 26.6 percent. During 1981 44.4 percent of the shop chiefs were released, as were 27 percent of their deputies and 32.8 percent of the foremen.

Such are the overall figures that characterize the parameters of the general problem. In addition to these, one can give one more conclusion which is exceptionally important for the development of the program entitled "Social": the main reasons for personnel turnover are among those that depend on the enterprise and on the collective. They include poor organization of production, a lack of rhythm in the work (24 percent of those who left); poor working conditions (16 percent); dissatisfaction with wages (20 percent); and a lack of housing (16 percent).

Analysis showed that the reason lies, for example, not in the low earnings, but in the shortcomings in the system of wages and bonuses and the lack of correspondence between the amount of earnings and the volume of work. Thus a

worker on the main tractor assembly conveyor receives 1.4-1.6 times as much as does a fitter-repairman with higher (category) qualifications.

The Choice of a General Goal

Now it was necessary to determine the general goal of the comprehensive program entitled "Social." It could have been the provision of highly skilled, socially active personnel who could carry out the difficult production assignments with high labor productivity and good product quality. But this seemed too abstract for the managers of the association. A more acceptable general goal was to reduce labor turnover by the end of the 11th Five-Year Plan to 15 percent. But the discussion showed that there are flaws in this. The consultants emphasized that reductions can be achieved through administrative measures while the aforementioned social problems could remain unsolved.

In the final analysis the general goal of the "social" program which was brought up for discussion by the party and economic aktiv of the association in 1983 was defined as follows: "To increase the stability of the collective by 20 percent as a result of increasing the occupational and sociopsychological adaptation of newcomers, and to correspondingly reduce the selection of unstable personnel."

Other goals were reflected in the form of goals of the subprograms. Initially it was intended to have six of these subprograms, but finally there were only four: "The First Manager," Personnel," "Food, Daily Life and Housing," and "Health."

Breaking the "Vicious Circle"

Setting goals and achieving them are closely related to strategy. The latter follows of its own accord--breaking the "vicious circle." This meant:

recognition of the primary importance of the problem and the need to apply the efforts of the entire collective and all services and subdivisions for its solution;

a change in the orientation of the members of the collective from current tasks to long-range ones;

a changeover of the technical, economic and social policy to intensive methods, particularly to work with fewer personnel, increased qualifications, elimination of a certain number of the work stations, primarily those with manual, less skilled labor;

the establishment of a businesslike democratic style of management at all levels with a simultaneous increase in the efficiency and precision of control over the implementation of the decisions that are made;

stabilization and qualitative improvement of management personnel, especially line managers;

increased responsibility of line managers, collectives and social organizations for the stabilization of personnel and increased labor discipline;

rearrangement of the structure and reorientation of the work of personnel services taking into account and registering the control of the processes of the formation and development of personnel;

the development in the workers of a feeling of pride in the enterprise on the basis of improving the tractors that are produced and advancing the overall art of production;

the creation of a situation of extensive publicity of decisions, correctness and completeness of information, and mandatory keeping of promises;

the implementation of measures for improving working conditions and strengthening the health of members of the collective;

gradual reduction of the hiring of potentially unstable personnel.

A good deal that is contained in the program that was adopted works on the "break": the subprograms, blocks and measures from these blocks. Among the subprograms, for example, is stabilization of management personnel. Among the primary measures is the creation of a service for stabilizing the labor collective following the example of the Perm telephone plant. Such a service, consisting of five-six workers, makes it possible to reduce labor turnover throughout the association by 1.5-2.0 percentage points and in the subdivisions under its control--by 7-8 percentage points.

It is also necessary to introduce for 1-2 years special bonuses for line management and personnel of technical services for their work to reduce personnel turnover; and in certain sections to remove limitations on overfulfillment of output norms and provide additional stimulation of the collectives of brigades to reduce the number of personnel.

One is attracted by the fact that the proposed measures as a whole do not require significant capital investments and involve mainly a rearrangement of certain elements in the organization, a redistribution of rights and responsibilities, the introduction of temporary systems of incentives, a change in the set of evaluating indicators, and so forth.

The subprogram entitled "Personnel" is called upon to provide for staffing all subdivisions with workers at no less than 95 percent of the planned level (only half of the subdivisions had reached this indicator at the time of the development). The goal of the subprogram entitled "First Manager" is to retain management personnel in their positions and to reduce the level of their turnover to 5 percent (during the years of the five-year plan it was, respectively: 1983--no more than 15 percent and 1984--no more than 10 percent as compared to 30 percent during the initial period).

We shall discuss the subprogram entitled "Health" in greater detail. The reason for 35-40 percent of the failures to appear at work because of

temporary disability had to do with colds. Yet the association spends large amounts of money in preparing for the winter. Obviously this money should be used on more effective measures, as has been done. When the discussion comes around to working conditions, people frequently correct what should have been completely eliminated or radically changed, in other words, they "hold the line." It is much more expedient to change the structure of expenditures and use the money for measures which provide, for example, for elimination of work stations with harmful and difficult working conditions. This is the direction which has been selected.

In addition to the creation of new medical and sanitation institutions in the association (a permanent hospital with 200 beds in 1983, a division for convalescence for patients with cardiovascular and neurological diseases, and a preventive medicine sanatorium in 1985), it is intended to have outpatient observation of a group of youth until they are 30 years of age and preventive occupational and industrially caused diseases for workers in the casting and smelting production. Implementing this subprogram will reduce losses of working time because of illness 1.5-fold during 1981-1985.

The program entitled "social," in the general opinion, has turned out to be one of the most difficult, since it was necessary to do the impossible--satisfy the growing demands of the people. Therefore both the consultants and the working group of specialists of the association had to revise it several times after the program was discussed at the meeting of the party committee, at the meeting of the party and economic aktiv, and in the staff for developing the comprehensive program for the development of the PTZ.

The First Results

The program has been developed and the program is being carried out. Thus the staffing of all subdivisions of the association with personnel was provided by no less than 95 percent by the end of 1983. The shift work of the first managers of services and shops decreased by 6 percent as compared to the first half of 1982. The overall turnover of personnel had decreased by 7.5 percent in 1983. People who have been fired from the association two times or more are not accepted back, with the exception of cases when the brigade council submits a petition. We have put a stop to hiring people who were released because of absences or who left production of their own accord. Again the only exceptions are made by a decision of the council of the brigade where the worker is being assigned.

During 1983 as compared with a similar period of the preceding year, the number of absences decreased to five-sevenths, and the number of absentees decreased by more than one-fifth. There were almost a thousand fewer people who were late from work. Losses of working time because of absences, tardiness and violations of the law decreased.

A hospital to accommodate 200 and a kindergarten for 320 were introduced, and in 1983 about 20,000 square meters of housing were released. The first tons of meat and vegetables from the subsidiary farm have been sold. Eleven mechanized lines for distributing complete meals have been installed.

Of course, it is necessary to continue to work on the program, but what has been done inspires optimism.

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IMPLEMENTATION OF THE 'PROFITABILITY' PROGRAM DESCRIBED

Novosibirsk EKONOMIKA I ORGANIZATSIYA PROMYSHLENNOGO PROIZVODSTVA (EKO) in Russian No 11, Nov 84 pp 37-39

[Article by V. G. Voronin, deputy general director of the PO PTZ for economics, and N. N. Kartashov, Scientific Research Institute of Systems of the USSR Minpribor (Novosibirsk): "Instead of Losses--Profit"]

[Text] Before 1982 the association operated at a loss, and the losses almost never decreased, amounting to more than 40 million rubles a year. A comparative analysis among the plants showed that the complete production cost of the DT-75M Kazakhstan was almost 30 percent higher than that of a tractor of the same design produced by the Volgograd tractor plant. The same thing was true in individual sections. Just by reducing the production cost to the average branch level it was possible to obtain a profit of almost 20 million rubles.

During the period of the development of the comprehensive target program (June-October 1982), profitability in the PO PTZ amounted to approximately 2 percent (the profit included in the cost of the fixed production capital and the normed circulating capital), which was achieved mainly as a result of revising the prices for the DT-75M tractor. It became the goal of the program entitled "Profitability" to raise this to 8 percent by the end of the 11th Five-Year Plan. The normative for each year (1983-1985) was taken as an increase in profitability of 2 percent.

The goals of the program entitled "Profitability" were formulated on the basis of the task of improving the utilization of resources, which will make it possible to reduce expenditures on the output of the products. They singled out three subprograms which correspond to the main areas for reducing production costs. They envision a reduction of expenditures: on equipment, instruments and technological fittings (the subprogram "Fixed Capital"); on raw and processed materials, purchased items and semimanufactured products, fuel and energy (the subprogram "Material Circulating Capital"); and on wages (the subprogram "Labor Productivity").

One cannot use the same ways of reducing expenditures for different productions and shops. Thus in machine assembly production alone there are 500 units of surplus equipment, and the expenditures on maintaining it amount

to more than 3 million rubles, including 800,000 rubles in amortization deductions. According to our calculations, by selling the unused equipment or loading it to the normative it would be possible to release approximately 10-15 million rubles' worth of fixed capital. Or, for example, it is necessary to evaluate the economic expedience of manufacturing certain items in shops of the PO PTZ instead of acquiring them from other enterprises.

Normatives were also developed for warehouse remainders for each kind of material resources, and assignments were set for bringing them to the normative level where necessary. This will release approximately 3.5-4 million rubles in circulating capital.

Among the main blocks of the program "Profitability" are measures for developing brigade forms of organization and stimulation of labor. Their realization will make it possible to increase labor productivity by 5 percent annually until 1985.

Intrabusiness cost accounting [khozaschot] was taken as the main organizational and economic instrument for increasing the profitability of production. Therefore the subprogram "Cost Accounting" was separated out within the framework of the program "Profitability."

The cost-accounting system in the association had a number of shortcomings. The main one was the orientation of internal subdivisions toward volume indicators--commodity and gross output. These indicators were established for the plants, shops, sections and brigades. The activity of the subdivisions was evaluated according to them. Therefore the restructuring of cost-accounting relations was based on an evaluation of the effectiveness of the work of the subdivision in terms of its final result, that is, in terms of the degree of satisfaction of the requirements of the consumer. This meant primarily completeness of the products and their high quality.

It was necessary to strengthen the role of the indicator of "list of items." To do this both the planning and the accounting of the output of products had to be done in sets, that is, it was necessary to utilize unified planning and accounting units of measurement. A system of sets is being developed--shop, section and brigade--which orient the subdivisions toward the output of the final product. If even one detail is missing, if even one operation is not carried out--the set does not count. This is the way it is done in the best mass productions.

An important role in increasing the effectiveness of cost accounting is played by the organization of accounting and control over the expenditure of material resources in the shops. Consolidating the brigades will make it possible to register the materials that are transferred to them. The installation of meters and gauges for expenditures in all the shops, and the conducting of monthly inventories are necessary conditions for more precise accounting and control. It will be possible to inform the brigade of the indicator of the production cost (for a reduced list of calculation items).

The changeover to the new methods of work frequently requires changes in the external conditions. Moreover, they must also demonstrate their advantage

over the old ones. Therefore the work for improving cost-accounting methods of management and their introduction into practice should be carried out in stages, beginning with two or three shops. Taking into account their work experience for improving cost accounting, this improvement should gradually be extended to other shops.

The final stage in the work on the program "Profitability" is the calculation of the economic effectiveness of the proposed measures and the selection of the most effective of them. In this stage the economic services which are engaged in the development render assistance to other programs, acting in the role of consultants for them. They help to calculate the economic effect and find the most economical methods of achieving the goal. The overall economic effect is calculated, as is also the effect in the various sections (procurement, processing, assembly) and the main components of the tractor.

The first results show that the association is on a correct path. Thus in 1983 the balance profit had increased by 9.3 percent, and labor productivity--by 5 percent. The output-capital ratio improved, and the production cost of the products was less. As a result, during the first half of 1984 alone we received more than 700,000 rubles in above-plan profit.

From Letters

It is necessary to have consultation groups (firms) where scientists and managers will work when they have reached an age when it is time to turn over their chairs to young people. And let the former managers give advice on how to remain in these chairs for more than 1 year.

N. M. Bodrova,
Moscow

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IMPLEMENTATION OF 'AUXILIARY PRODUCTION' PROGRAM DESCRIBED

Novosibirsk EKONOMIKA I ORGANIZATSIYA PROMYSHLENNOGO PROIZVODSTVA (EKO) in Russian No 11, Nov 84 pp 40-43

[Article by V. S. Moroz, deputy head engineer of the association, and B. S. Churyumov, candidate of technical sciences (Novosibirsk): "...And There Turned Out To Be Enough Resources"]

[Text] Among the resources necessary for producing tractors are workable equipment, reliable fittings and highly productive instruments. What are the characteristics of these in the association?

First of all, equipment. From the standpoint of the production of the final product, much of it is superfluous. Because of the lack of the proper accounting and analysis, one cannot consider as efficient the utilization of working machines, machine tools, sets of equipment, lines and so forth. Downtime, which frequently takes place in the shops because of the poor working condition of the equipment, has not been taken into account, and there are no statistics on whose basis it would be possible to make a decision concerning eliminating it. Sometimes we have repaired machine tools or machines which were no longer operating. There has been no systematic approach to planning planned preventive repair jobs. The structure of the latter has not reflected the actual load or the conditions for the operation of a specific machine tool or set of equipment.

The same thing can be said about the control of the instrument supply at the association. There has been the following opinion regarding instruments and fittings: the more there are of them, the better for production. But this has not always been true, the more so since the proportional expenditure of instruments and fittings has exceeded severalfold the level reached at leading enterprises of the branch. Thus for each ton of stamped pieces we have used 5-8 times more fittings than they have at the Volgograd Tractor Plant. Moreover, we thought that the plant was not producing enough instruments and fittings. Just an analysis in conjunction with the consultants revealed how erroneous this opinion was. Resources that are stored up "for any occasion" are expended inexpediently--this is what was wrong. The results of the analysis were so convincing that we had to restructure our work and, which is even more important, our thinking.

The analysis revealed the sources of the existing situation. The plans of the Pavlodar plant for special instruments and technological fittings were drawn up in monetary terms. The orientation toward the gross indicator involved this principle: the more that was expended on instruments and fittings, the better for the plant. The following approach took form: I will take as much as I can and use as much as I want to. The fact that the supply of fittings and instruments as well as the accounting and control were not reinforced by economic stimuli and sanctions also played a role here. As a result, in the plants of the association units of instrument building were created which actually duplicated one another. The decision concerning the planning and creation of fittings and instruments was made without the proper substantiation in nine different subdivisions which were not organizationally connected with one another. There was no unified mechanism for control and coordinated planning of the activity of the services engaged in the design, manufacture, repair, supply, storage and other stages of the life cycle of instruments and fittings.

Such a situation could not last much longer. A special comprehensive program entitled "Equipment, Instruments and Fittings" was developed in order to eliminate it, and was included as a constituent part of the unified comprehensive target program for the development of the association.

The program entitled "Auxiliary Production" was drawn up in the following way. First we revealed the problems, for which we used a questionnaire, analysis of its results and the construction of a tree of problems. The basis for the last procedure was a standard tree of problems which are typical in general of auxiliary productions. As a rule, the main one in this case is the lack of coordination of the interests of the basic and auxiliary production. The latter is usually regarded as some kind of reservoir from which one pumps resources for the former. It is expected to solve current problems--eliminating emergencies and breakdowns, and making up for shortages of fittings and instruments in emergency situations. Here the orientation toward the final product of the association and the long-term goals which determine product quality, increased labor productivity and improvement of its conditions fall into the background. In practice, for example, there is silent recognition of the fact that it is sufficient to fulfill the volume of work in the so-called future directions by 80-85 percent. And credit will be given for it.

This lack of coordination between basic and auxiliary productions is manifested especially clearly in the irresponsibility which is engendered by the lack of a unified master of resources. For, in essence, nobody was responsible for the indicators of the work of the "reservoir" and they did not even know what was in it. After the instruments and fittings were manufactured nobody at the procurement plant checked on their subsequent life cycle, that is, the modernization, restoration, repair and so forth, and the user was forced to create his own system, right down to an instrument shop.

It is not surprising that there was no complete and reliable information on the actual wear and tear of instruments, fittings and equipment at a single one of the services of the association. In the "reservoir" shops sometimes up to 80 percent of the instruments and fittings were not needed by anyone and

were not used during the course of the year. Consequently, there was no need for information either, for everyone had the right to make unending demands: "Give!" There was, to be sure, an "overflow valve": by the end of the planning period the instruments and fittings were written off in the production cost, and what was written off was basically retained in material form in these same reservoirs.

The instrument division of the association, which according to the idea was to have carried out the planning and control of this entire business, was under the jurisdiction of the instrument plant, with all of the ensuing consequences. The same thing can be said about the head mechanic's division: he did not control the life cycle of the resources that were related to equipment and therefore his role was constantly being reduced.

The goal of the program entitled "Auxiliary Production" was gradual centralization of the services of the system of repair and instrument supply, which encompasses the life cycle of the resources. There was no need to search out new resources. There were plenty of them. Thus, along with the repair and mechanics plant, capacities almost equal to its own were dispersed throughout the shops. In other words, it was necessary to pump what was contained in the "little reservoirs" into a large "reservoir" and to arrange centralized control over the latter.

But what was proposed and thought of, and what was actually carried out? First, the repair and mechanics plant was broken down. The instrument division goes beyond the framework of the Pavlodar plant for special instruments and fittings and is beginning to work for the goals of the association. The indicators of the growth (report), by an order of the general director, were abolished and replaced by calculation indicators. During 1983 the proportional expenditures on auxiliary production were reduced by 20 percent, up to 50 percent of the unutilized instruments and fittings were removed from production, and expenditures on their design and manufacture were reduced by 15 percent.

Goals have been set for modernizing equipment, providing for planned preventive repair of from 60 to 100 percent, increasing the operating ability and technological precision of the equipment, and replacing worn-out and obsolete equipment. And these are long-term goals. A similar reorientation is taking place for instruments and fittings.

From Letters

Regardless of the branch jurisdiction, many enterprises have the same problems, and they lie in management. Therefore consultants in management are needed.

E. Yu. Simanavichkyus,
Chief of the Division for Automated Control
Systems of the Nitrogen Fertilizer Plant,
Ionava, Lithuanian SSR

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'ACCOUNTING-ANALYSIS-CONTROL' PROGRAM DESCRIBED

Novosibirsk EKONOMIKA I ORGANIZATSIYA PROMYSHLENNOGO PROIZVODSTVA (EKO) in Russian No 11, Nov 84 pp 44-47

[Article by A. S. Pavlov, chief of the association's planning and economics division, and N. B. Mironosetskiy, doctor of technical sciences, professor, Institute of Economics and Organization of Industrial Production of the Siberian Branch of the USSR Academy of Sciences: "Dual Result"]

[Text] If you walk through the territory of the association you will notice that there is a tractor component lying there for everyone to see. You may ask: "Will they leave it lying there until our next visit?" They will answer: "No, it will be picked up during the preholiday cleanup." And yet someplace is probably experiencing a shortage of this component or at least of the metal and labor that goes into it, and all anybody ever talks about is the shortage.

In the party and economic aktiv the association's head bookkeeper gave the figures for the overexpenditure of materials in the tailings yard. Yet there are no scales there, and there are not enough monitors or meters. But the most important thing is that there is not enough initiative which would make it possible to eliminate hidden and obvious losses.

The situations are no better in other shops where most frequently blanks and parts lie around in heaps. How much of them are there? One frequently hears: "Too much to be counted."

On the whole accounting in the association was poorly arranged, but how can one do analytical work without it? The association's operation was not analyzed frequently, and when it was analyzed it was formal in nature and, as a rule, it was impossible to use this analysis as an instrument for management. Thus among the 50 "main technical and economic indicators of the operation of the association" (about 500 figures) which are distributed to the managers and head specialists each month in 200 copies, there was not a single indicator of quality and the rhythm of the operation was not described sufficiently. Taking into account the requirements of the target-program approach, this document was revised.

For efficient management of production, electronic computers should be used more extensively for preparing daily analytical summaries and surveys. Each day the workers of the planning and economics division compiled for the management reports on 23 shops which contained more than 800 figures, and workers of the production division prepared about 2,000 figures.... Now the association has developed and is introducing an information system called the ASU Direktor, which makes it possible to relieve engineers, economists and other specialists of routine work and to direct their efforts toward solving analytical problems.

As it turned out, not a single one of the kinds of reporting in the PO PTZ met the requirements of definiteness, completeness, analytical qualities or reliability. It is a paradox but the association had both not enough and too much information at the same time. For example, in the technical control bureau for the release shop each day information accumulated concerning the misrepair of tractors because of various kinds of defects, the guilty parties and so forth, but this information was used only episodically. Many managers had no idea that this information even existed and no measures were taken on the basis of this kind of reporting. "Superfluous" information and the fact that during the first 208 shifts that had the best management, repairs, transportation and material, for many months they did not meet the schedule once, turned out to be unexpected.

Another example. Each year up to 5 percent of all the tractors were returned by the receiving office of Goskomsel'khoshtekhnika because of weak tightening brackets. In keeping with the results of an analysis conducted by workers of the division of technical control in conjunction with the engineering services, economists and representatives of the receiving office, within the technical control bureau special brigades of fitter-controllers were created. The return of the tractors for this reason decreased by more than half.

One cannot say that all of the aforementioned problems were given no attention in the association previously. But during the course of the development and implementation of the program "Accounting-Analysis-Control (UAK)" we were able to determine the goals and tasks more precisely and to concentrate efforts and resources on achieving them. The orientation toward supporting target programs determined the structure of the "UAK." It included the subprograms "UAK-Quality," "UAK-Rhythm," "UAK-Profitability," "UAK-Social Processes," "UAK-Auxiliary Production" and "Control of Decisions."

At the beginning of 1983 the association had about 100 tasks for ASU, but they were actually "working" on only 24 of them, and for various reasons the rest were not used. By the end of 1983 development had been completed on a complex of problems, and 27 of them were to be introduced during the next year. Thus in the program "UAK" a long-term part is being developed, which will grow into an independent program on the basis of further automation of accounting and control and the transfer of its computers to the ASU TP and the ASUP.

The basis of the management activity is the information system with which the "UAK" begins. The information should be gathered directly during the production process, it should all be convenient for feeding into computers, and it should contain the signatures of the responsible officials. The

existing document circulation had to be restructured. Here it is appropriate to play a business game which makes it possible to determine which information is necessary, when and for which management decisions.

The capacities of the association's computer center made it possible to utilize one of the data bases which had been tested by practice. In the near future it was decided to introduce the ASU Sigma for management of production. They will also be able to use universal data bases for accumulating, processing and putting out information. On the basis of this it will be necessary to realize the subprograms "Input Control of Product Quality," "Analysis of Defects in Production," "Accounting for Complaints," and several tasks in accounting for production indicators--for labor, production cost, accounting and control of indicators of production services, analysis of incomplete production and fulfillment of daily shift assignments.

The mastery of the data bank and the capabilities of the computer center makes it possible to raise the level of utilization of computer equipment with terminal devices and to develop in the management staff workers a taste and skills for utilizing data bases. Then it will be possible to go over to other subprograms of the "UAK."

The proposal to realize what has been earmarked gradually and in stages is of principal importance. This does not stand in contradiction to the idea that the programs should provide a burst of energy. For instance, an important problem in the association is the lack of immediate and reliable communications. It would be naive to think that modern means of communication could be provided for it in the near future. Therefore it makes sense to begin with something more simple and temporary. In particular, we should organize an internal flow-line service--with special transportation and efficient regulation of operation. With efficient organization of document turnover the postal service of the subdivision can provide for efficient control in a short period of time. And the general line toward introducing modern means of communication will be retained.

It is not difficult to transform the diagram of the program into a network schedule. It is necessary only to clarify the ratios and, with the help of expert evaluations, determine the time, cost and resource parameters of each job. The simplest imitation model makes it possible to construct various estimates of parameters for implementing the program. The diagrams can be restructured and the resources redistributed, depending on the goal. Moreover, it is important to develop alternatives.

In 1983 the implementation of the subprogram "Control of Decisions" was advancing most rapidly. In keeping with it we basically completed the planned measures and jobs: providing for control over the fulfillment of instructive documentation of the USSR Ministry of Tractor and Agricultural Machine Building, the Soyuzpromtraktor All-Union Production Association and other higher organizations; the execution of orders from the general director and instructions from the head engineer is being supervised fairly efficiently; and the results of the supervision are reported in the form of information chiefs and are discussed each week by the association's council. The first section of the ASKIZ (automated system for control over the fulfillment of

assignments) which was introduced with the YeS-1022 computer makes it possible to check on the levels of management, the responsible officials and the controllers; and it provides for issuing warnings when the deadlines are approaching.

An analysis of the fulfillment of assignments showed that there were half as many of them, that is, that they were consolidated. The number of assignments that were not fulfilled decreased severalfold. Thus a dual result was achieved: efficiency increased in the number of orders, instructions, measures and so forth decreased. What is a rule in the association today would have seemed improbable in 1982--one must not issue an order until the preceding one has been carried out.

The accelerated implementation of the subprogram "Control of Decisions" is explained by the interest of the management of the association--and above all the highest level--in increasing control over the implementation of the decisions that have been made and increasing responsibility and executive discipline.

Measures have been completed for the subprogram "UAK-Social Progress." The group of programmers and workers of the personnel divisions traveled to the Altay Motor Construction Association to become familiar with the functioning of the ASU "Sigma-Labor Resources."

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IMPLEMENTATION OF 'REGULATION' PROGRAM DESCRIBED

Novosibirsk EKONOMIKA I ORGANIZATSIYA PROMYSHLENNOGO PROIZVODSTVA (EKO) in Russian No 11, Nov 84 pp 48-50

[Article by M. I. Golubev, assistant general director of the PO PTZ for labor and wages, and V. Sh. Rapoport, chief of the division of administrative procedures of the KamAZ Production Association (Brezhnev): "Not to the Detriment of An Initiative"]

[Text] An important element in the organization and management of collectives and individual activity is regulation. With the help of this, that which is necessary for achieving the goal is reinforced. It was also necessary when carrying out the target-program approach in the PO PTZ. The programs must be drawn up, carried out, coordinated with one another and, of course, they must be mandatory. It was necessary to have greater order when applying the system approach--this was a kind of argument in its favor.

In their analytical notes the managers of the association emphasized the need for regulation even without changing over to the new system of management, and therefore it was not necessary to convince anybody of the usefulness of the program "Regulation." Two parts were proposed in it: short-term (even immediate) and long-term. The former was represented by the subprograms "Official Instructions" (provisions concerning the rights and responsibilities of the workers in the structural subdivisions) and "Daily Routine" (reinforcing efficient conditions for labor and recreation and various kinds of conferences). It was also suggested that the long-term part be divided into two subprograms: "Management Procedures" (on the technology of management and the adoption of management decisions which are reinforced in the standards of the enterprise, instructions and recommendations) and "Organizational Structure" (gradual improvement of the organizational structure and bringing it closer to the requirements of target-program management).

When revising the provisions concerning the subdivisions and the official instructions it was necessary first of all to envision a consistent delegation of authority from above to below. This, on the one hand, increases the initiative of all workers and, on the other, makes it possible for managers of a higher rank to engage not so much in concrete operational issues as in the development of programs and long-term plans. The main thing is to overcome irresponsibility, since the responsibility has been transferred to higher and

higher levels of management, and the latter have simply been physically incapable of bearing it. The effectiveness of management and the association has been reduced significantly because of the indefiniteness of responsibility of the junctures between various subdivisions: line and functional services, services of various levels (association--plant--shop). Some of the work and responsibility has been duplicated when there has been no special need for this, and some of it seems to have been simply ignored. No cooperation has been achieved in management.

Drawing up the new official instructions has required a redistribution of the official responsibilities of the executives. Not everyone wants to part with some particular responsibility or to "load" himself with additional ones. But there is no other way. There is a limit, for example, to the number of subordinates whom one can manage effectively.

The main task, for example, of the subprogram "Daily Routine" is to change over in two-three stages to an arrangement of work for each month whereby all of the planned conferences conducted by the administration and public organizations will be regulated according to the days of the week and the hours, and the overall number of conferences on directive issues will be gradually reduced. The order of the work of the management personnel and the public organizations would prohibit, in particular, all planned conferences and meetings before 2 pm and after 6 pm, and the managers would have to spend a maximum of more than 16 hours a week in meetings. The general director or his deputy for production would conduct the conferences on the course of production once a week, and the head dispatcher would provide news bulletins once a shift.

Although the process of regulation is continuous and the documents themselves are constantly being updated, the program entitled "Regulation" should be completed in 1985. But before this it will be necessary to develop and implement the program "Administrative Procedures," which will begin by compiling and informing everybody of the list of the already published documents. They prescribe various actions regarding management technology and systematization of these actions in various directions: quality control, control of material and technical supply, management of labor resources, and so forth.

Up to this point many documents that regulate management activity have been prepared in the association with significant deviations from well-known rules: they have not been coordinated with all of the main performers of the work and sometimes they have not been coordinated with anybody at all, and they do not indicate the responsible people and the address of those to whom the results of the work are to be submitted.

In the subprogram entitled "Organizational Structure" we have raised the task of analyzing the variants of the improvement of the management structure. For example, putting the association's top brass to work solving long-range problems, putting the consumer services under the jurisdiction of the deputy general director for personnel, and, in turn, giving the general director jurisdiction over the department for automated control systems, the management division and so forth. Instead of plants, it is necessary to introduce

productions as, for example, at the ChTZ, to gradually centralize all auxiliary services and productions, and to expand the scientific research division, making it a scientific research center.

In some situations, outside the framework of the target-program approach, new documents would perhaps be regarded as a manifestation of bureaucratism. But they are required by life. Cooperation has convinced us that regulation cannot only suffocate initiative, but also reveal it.

By the end of 1983 the first stage of the program had been carried out in keeping with the earmarked deadlines. About 200 official instructions and provisions had been developed. The routine of the working day had been established for all managers of the association, from the general director to the production foreman.

The introduction of regulatory documents made it possible to relieve many managers of functions that were not particularly theirs and gave them the opportunity to engage in issues which correspond to the position they hold. Not everybody perceived the regulation correctly. For example, they refer to the fact that the regulation is sanctioned by the ministry, but we engage in it ourselves. But internal regulation which is allowed by legislation does not require the intervention of the ministry, and it must be developed by relying on the target-program approach.

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CONSULTING TECHNIQUES, PRIORITIES REVEALED

Novosibirsk EKONOMIKA I ORGANIZATSIYA PROMYSHLENNOGO PROIZVODSTVA (EKO) in Russian No 11, Nov 84 pp 51-53

[Article by Yu. I. Tychkov, candidate of technical sciences (Novosibirsk): "The Primacy of Strategy"]

[Text] In the association where I was one of the consultants I was struck by the difference in the style and methods of management to which I had become accustomed and which, in my opinion, correspond more or less to today's requirements, on the one hand, and those which were applied there, on the other. The so-called authoritarian style of management prevailed. The first manager handled if not all, then the majority of problems of administration. This was reflected in too large a number of conferences at all levels. Holding two daily dispatcher conferences with the participation of the general director and the head specialists leads to the following negative consequences.

Knowing that the top brass is dealing with current production twice a day, the managers of the lower levels--consciously or unconsciously--shirk responsibility for various decisions, including those which lie in the sphere of their competence. In my opinion, this does not contribute to establishing an independent style in management.

I got the impression that with this style and rhythm of work, it is generally difficult for the first managers to solve systematically those strategic problems in the development of the enterprise: capital construction; improvement of management, particularly its structure; selection of personnel and goal-directed work with them; selection of the products list, and its defense. After daily dispatcher conferences one cannot forget about concerns to the effect that the delivery of bearings will be threatened the next day, there is a danger that the cabs will not be delivered on time for assembly, and so forth. It is simply impossible for the manager to escape such concerns, which means that he is not in a position to deal with other issues. Current problems absorb almost all of his attention.

The crucial problem I saw in the picture which had taken form in the association is explained by the fact that I myself have experienced something similar, but was able to put a stop to it almost a decade ago. Being the head

engineer and attending operations meetings, at that time I came to the conclusion that 99 percent of the problems could be solved without me. The same thing had taken place earlier when I had worked as a head technologist. Because of discipline I could not but admit that I simply did not have the right to transfer the work that had been entrusted to me to my subordinates since I myself was the initiator and a participant in the discussion of it. I was convinced that the position of the head engineer and the head technologist in the association was no better. A person's organizational capabilities are revealed only if he is able to make decisions independently.

At the upper level of management of the enterprise it is sufficient to have three to five regulations conferences a month, including the one for summing up the fulfillment of the plan. The conferences are regulated for each manager. Different participants should be invited to different conferences--people who are directly responsible for the matters under consideration. The application of this rule alone releases head specialists from a minimum of half the conferences. In Pavlodar I attended a dispatcher meeting in the association in which half of the participants did not become involved in the discussion at all, and they were the higher managers.

In order to increase the effectiveness of management (adopt optimal decisions, provide for control over their fulfillment and efficiency), it is also necessary to develop and plan the formal methods for this. Because of these the manager will always know when and where he can obtain the documents or information necessary for his work, to whom to give them and at what times, and how, in what sequence and what functions (submitting the plan, dealing with a "shortage" in the shops, and so forth) he should perform them.

In the association it is also useful to create a so-called group for analyzing situations. For each kind of resource the group prepares quarterly analytical surveys which reveal the tendencies that have taken form. It works under the methodological guidance of the planning division, but is immediately subordinate to the director. The surveys give conclusions about the utilization of the active part of fixed production capital and about labor resources, materials, technical equipment and the condition of finances.

From the sphere of technical management I can advise specialized laboratories which are called upon to develop the most important areas during a given period: for example, ASUP and robot equipment. The director has a right to create them without obtaining permission from the higher agencies.

If one does not improve management in such areas as the provision of information for managers, analysis in order to ensure quality, the application of formal methods, and improvement of the structure in order to increase effectiveness, it is difficult to imagine that the top manager will be able to ensure in his activity the primacy of the strategy of development of the collective as a whole over current issues. And without this no efforts of the will can help to change to a different style. If one is fully informed one is able to foresee any problem in the future; if analysis is conducted--one will know the existing long-term tendencies; if there is clarity in the distribution of functions--nobody will try to shift his tasks to other people;

if the structure is constantly being improved--it is easy to always be responding to the changing requirements. Desire alone is not enough here.

The complexity of carrying out the new style of management proposed to the tractor builders consists in the following. Since no responsibility had been envisioned for lower managers previously, the general director doubts their ability to solve problems at their own level of confidence. It is impossible to teach them to be leaders with just an order or a sharp turnabout in management activity. The only path is the evolutionary one. For example, first one must change over from two conferences a day to one conference. The general director should send problems to lower levels, checking on their solution and not taking them back, regardless of how many mistakes are made at first. Subsequently, it is necessary to change from daily conferences to conferences that are held every 10 days. And, possibly, for a half year the general director could refrain from participating in operations meetings.

Evolution does not mean losses or, rather, a failure to obtain an effect as is the case with sharp changes. It envisions consistent, systematic work for improving management within the framework of drawing up and carrying out target and support programs. I also advise strengthening formal methods whereby everyone knows his own maneuver and it is easier to change managers and to get used to a new position, and sharp conflicts are eliminated. These methods are reinforced in the program entitled "Regulation." It is already being drawn up and there are ways of improving it.

Each program has its own managers. They provide for successful implementation of the tasks--and this means that they can also work effectively as functional managers. The target-program method which is being proposed by the consultants will undoubtedly contribute to the creation of a new style of management of the association if it is accepted internally by the managers as the most expedient one.

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BUSINESS GAMES PLAYED AT ASSOCIATION

Novosibirsk EKONOMIKA I ORGANIZATSIYA PROMYSHLENNOGO PROIZVODSTVA (EKO) in Russian No 11, Nov 84 pp 54-57

[Article by V. F. Komarov, candidate of economic sciences, Institute of Economics and Organization of Industrial Production of the Siberian Branch of the USSR Academy of Sciences (Novosibirsk): "How To Control the Program"]

[Text] With any innovation there are unsolved problems and mistakes. This is precisely why we have laboratory and experimental models of items, experimental shops and productions whose purpose is to conduct comprehensive testing of a new item.

The comprehensive target program can be regarded as a kind of complicated item which has unsolved problems which can be discovered and eliminated only in the process of the implementation of the program. Consequently, in this case it is extremely desirable to test the programs under experimental conditions. Such testing is also desirable because for production workers drawing up target programs is generally something new. During the process of the development of a program each participant contributes his own experience, ideas and knowledge, which not only differ greatly among various people, but also can contradict one another. Therefore testing of a target program is also necessary in order to unify the ideas of the participants and to develop homogeneous forms for structuring and describing it. We conducted these tests in the PO PTZ utilizing an imitation (business) game. Here is the essence of the tests.

The development of any program ends by drawing up a list of concrete measures. To implement the program means to carry out the measures that have been earmarked. Consequently, it was necessary to imitate the implementation and to make this into a business game. During the process of the game imitation it is possible to obtain experience in implementing the program and then reveal its shortcomings or incomplete aspects and make adjustments.

During the creation of the imitation game a number of difficulties were discovered. First of all it became clear that for comprehensive, all-round testing of all the target programs in their entirety it would be necessary to create an extremely complicated imitation system on the basis of a computer

which was comparable in labor-intensiveness to the creation and development of an ASU: individual programs in the PO PTZ include up to 600 jobs.

It turned out to be preferable to use a relatively simple imitation game in which it would be possible to test a small group of the most important issues in drawing up and carrying out the programs.

We based the game on a previously developed variant of the system of control of the program. In keeping with it it was intended to plan and control the process of its realization in three stages: quarterly calendar planning, weekly control and monthly accounting for the course of the work. Here is their content.

At the beginning of each quarter one makes more precise or draws up a list of measures and jobs for each program: one determines the normative duration of the work, the resources and the parties responsible for carrying it out. The calculation of network schedules provides a calendar plan. Taking advantage of the plan, workers of a special agency ("Operations Control Group") assigns the parties responsible for performing each job. The form of the "assignment" provides three detachable control coupons--one for each month.

By each Monday the people responsible for carrying out the work use their detached coupons to inform this group about the performance of the work whose deadlines have passed. The group registers on the "screen of the course of the work" the state of affairs with respect to the program.

At the end of each month they take stock of the state of affairs with respect to all jobs in each program. Technically, this is carried out by having the performers of each job submit their detached coupons, with an indication of the percentage of readiness of the work at the end of the given month. From this information they draw up an "operations summary" of the course of the work for the various programs, which will serve as a basis of information for conducting various conferences and taking measures to eliminate deviations. When the next month of the quarter comes the changes that have been accumulated are analyzed at all levels of control of the program, and proposals are developed for revising the composition of the measures and the jobs, and then the planning cycle is repeated.

The imitation game makes it possible with a simplified example to demonstrate to its participants how the system functions. It contains the roles of all the managers of programs and subprograms, the individuals responsible for measures, the members of the people's control group and the chief of the staff for coordinating the programs. During the process of the game participants on a compressed time scale (in approximately 6 hours) "live through" one quarter, sequentially carrying out the planning and control procedures prescribed by the system, including various kinds of conferences and coordination, and also a meeting of the staff for coordinating the programs.

In July of 1982 the imitation game was conducted initially by members of the group of consultants, and then in the association. All managers of programs participated in it, headed by the general director of the association--the chief of staff for coordinating the programs. Five subjects were developed:

preparation for the game, quarterly calendar planning of jobs under the program, weekly control over the course of the work, monthly accounting for the fulfillment of the plan, and arrangement of the fragments of the methods for drawing up the programs and the system of control over the course of their implementation.

By "playing through" the first four subjects, the participants mastered the methods and procedures of planning, accounting, and control, and also methods of decision-making with the utilization of the means demonstrated in the game of the system. In other words, in active form they studied and mastered the proposed variant of the system of control of the program and the variant of the formulation of the programs.

On the basis of a special questionnaire the participants in the experiment presented their suggestions regarding each subject that was brought up for discussion, the forms of documents and the analytical tables for the various programs; the personnel composition and the status of the various services involved in drawing up and carrying out the target program; the periodicity of the planning and control of the work; the need for and the composition of documents which determine the policy for drawing up, approving and implementing programs at the enterprise, and so forth. During the course of the final discussion on each of them, a variant of a decision was developed.

Let us note two positive results of carrying out the games. First, during the process of the game imitation of the experiment the participants saw something like the final result of their work on the target programs and traced the process of their implementation using a concrete example.

Second, the decision regarding each issue in planning or control over the work for implementing the program was made by the production workers themselves. In other words, a system was not imposed upon them from outside, and rather they themselves were the authors of it. As a result, there was no psychological barrier on the path to introducing the system for controlling the program. This distinguished the method applied here from the usual practice of improving systems of control, and particularly from the traditional methods of introducing ASUs. This fact is very important methodologically, and here is why.

Our approach provides an example of the concept of a prototype which is increasingly being used. In keeping with this, the introduction of plans for ASU's, new organizational structures, mechanisms for stimulation and other innovations can be initiated expediently with a demonstration to the production workers of the prototype of the new idea. Some suggest as a prototype the manual variant of the ASU, while others suggest a somewhat developed example of conducting calculations on computers while still others suggest a complex of detailed exercises involved in the new system of incentives.

From the prototype it is easy for the users to recognize the essence of the proposed organizational innovations and they can evaluate their acceptability at the enterprise. Second, a concrete dialogue concerning the prototype develops between the developers and the users.

In our opinion--and the experience of the PO PTZ has proved this once again--the best prototype for various kinds of organizational plans are imitation games which can visibly demonstrate dynamically all aspects of the innovations that are proposed.

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RECOMMENDATIONS FOR TARGET PROGRAMS FOLLOWED

Novosibirsk EKONOMIKA I ORGANIZATSIYA PROMYSHLENNOGO PROIZVODSTVA (EKO) in Russian No 11, Nov 84 pp 58-59

[Article by V. S. Zhigulin, secretary of the party committee of the PO PTZ: "Under Constant Party Control"]

[Text] The association's party committee has tried to maintain an interested attitude toward the recommendations of scientific consultants regarding the development of comprehensive target programs. This is precisely the approach that makes it possible to arrange systematic educational and ideological work, to place it on a scientific basis and to coordinate it with economic and organizational activity.

While supporting the target-program method which was suggested by the consultants, the party committee participated actively in the development of the programs and the control over drawing them up and carrying them out. One of the important tasks was to clarify the goal of the joint work of the consultants and the collective. The party organizers and propagandists attended lectures given by the scientists, and they themselves spoke before the collectives of the subdivisions. Even the first program which was approved by the party and economic aktiv, "Quality," was placed under quarterly supervision. The same thing has been earmarked for all the other programs. In 1983 the party committee considered only one issue at each of its meetings so that the other issue could be the control over the implementation of the programs. Continuous control is an indispensable condition for successfully carrying out what has been earmarked in the programs.

In order for the new method to be successful it is necessary to have the entire collective be vitally interested, from the manager down to the worker. Unfortunately, it is necessary to convince certain managers that raw data alone are not enough for effective management of modern production and the labor collective. It is necessary to have systematic training, the borrowing of advanced experience, the application of the fundamentals of social sciences and the help of consultants from the outside.

In order that each shop chief will say to himself that he can no longer work in the old way and in order for each to be able to manage people and not just

production, a program of ideological support has been developed. It consists of four subprograms: propaganda, control, publicity and development of patriotism.

Our special concern is youth. Turnover among youth up to 30 years of age is the highest. When they come to the association they do not find the most favorable conditions: in order to obtain a place in a family dormitory it is necessary to work 5-6 years, and an apartment--10 years. It is very easy for newcomers to take over the existing methods of management, which are frequently outdated, and we wish to counterpose the target-program approach to this.

The association's Komsomol participates in the target-program developments and their implementation and provide supervision over the output of products for export. Each quarter the staffs for product quality of the shops and divisions conduct inspections to check on quality, labor discipline, working conditions and assignments of graduates of vocational and technical schools. Of course these inspections will not help things much. The youth need their own program.

In my opinion, the program for ideological support is being fulfilled successfully. Even if not all managers have turned away from their own "high-powered" style and even though some still rely on intuition and their own personal experience in management, there is still appreciable improvement. And the more of this there is the more of a right we will have to say that we are succeeding in combining ideological and educational work with economic and organizational work.

From Letters

Consultation activity seems to be becoming one of the most necessary kinds of intellectual assistance to administrative and practical workers. In any case, for a ministry, a main board and so forth, an intelligent consultant is more valuable than 10 scientific and technical reports from scientific research institutes which solve "global" problems.

V. I. Shaykin,
Senior Scientific Associate of the Scientific Research
Institute of Automotive Transportation,
Moscow

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TRACTOR BUILDERS REPORT CONSULTING RESULTS

Novosibirsk EKONOMIKA I ORGANIZATSIYA PROMYSHLENNOGO PROIZVODSTVA (EKO) in Russian No 11, Nov 84 pp 60-61

[Letters from various tractor builders]

[Text] The attempt to introduce target-program management of production has shown that our association has everything necessary for good operation except for organization of labor.

V. Ya. Ruban,
Engineer, Casting and Forging Plant

I am fairly familiar with the program "Regulation." When it was being drawn up as, apparently, when the other programs were being drawn up, a "game" was played. This provided something but we stopped halfway through, without seeing all of the association's prospects. In my opinion, the managers of the association were not sufficiently oriented toward purposive and long-term activity.

The consultants lost a good deal by not supporting the ties with the middle level of managers and specialists, and also with the management of the Soyuzpromtraktor All-Union Production Association.

Although there were all kinds of public discussions of the programs and they were published in company newsletters, their content, development, adjustment and the course of their fulfillment were not made known to all of the workers.

The contacts with the scientists should be continued because the richest concentrated source of scientific-technical and economic knowledge, which was opened up when they appeared at the association, makes it possible to considerably improve our work.

N. M. Verem'yev,
Chief of BOTZ, Steel Smelting Shop No 1

A fairly detailed acquaintance with the programs "Rhythm" and "Profitability" convinced me that there would be results. I should note the major shortcoming

of the programs--their weak support with resources. But Rome was not built in a day, and we need time.

B. D. Solov'yev,
Chief of Steel Smelting Shop No 1

The consultants' proposals concerning management in the association should be carried out without waiting for all of the programs to be implemented. Contacts with the scientists should be continued until we see results which make it possible to draw a final conclusion about the expediency of our joint work.

L. V. Mukhin,
Acting Deputy Head Welder

Production Volume of Commercial Output in Main Tractor-Building
Associations of the Country, millions of rubles

	1975	1980
KhTZ	545	650
ChTZ	435	592
MTZ	487	578
VgTZ	472	501
ATZ	316	325
PTZ	184	249

Losses From Defective Work in Several Tractor-Building
Associations of the Country in 1980

	<u>Percentage of All Production Cost, %</u>	<u>Not Including Purchased Items and Semimanufactured Products, %</u>
VgTZ	0.67	1.28
ATZ	0.38	0.81
PTZ	1.20	2.71

Change in Basic Indicators of Operation of PO PTZ in 1983-1984

	First Half of 1983 Compared to First Half of 1982, %	First Half of 1984 Compared to First Half of 1983, %
Output: normative-net output	104.2	108.0
Tractors	100.0	106.3
Spare parts	112.5	107.0
Consumer goods	103.9	116.1
Proportion of products of highest quality category in first halves of 1983 and 1984, %	2.9	6.6
Losses from defective work in first halves of 1983 and 1984, in % of commercial output	0.71	0.67
Output per one worker (NChP)	102.7	108.5
Losses of work time because of absenteeism and administrative leaves	88.4	89.1
Output-capital ratio (output of products per 1 ruble of production capital)	101.8	103.5
Expenditures per 1 ruble of commercial output	100.2	98.8
Profit on books	95.2	156.0

From Letters

Management consulting has not yet received the proper amount of attention and concern from state and social agencies, and it is being done mainly as a result of the energy and enthusiasm of individual specialists and scientific collectives. Moreover, there is some doubt about the self-taught consultant. His work is not always effective and sometimes it causes direct damage to the reputation of the institute of consultants.

The most complete theoretical training in consulting work is received by graduates of the Institute of Management imeni S. Ordzhonikidze in Moscow. There are great possibilities at the Academy of the National Economy of the USSR and a number of other training centers for increasing the qualifications of managers. Perhaps there would be some point in creating interbranch centers for training consultants.

Unfortunately, frequently scientific goals are placed above production goals in such activity. But the applied potential of the science of management is increasing, valuable developments are appearing, and the number of skilled specialists is increasing. Extensive development of management consulting is one of the realistic and effective ways of accelerating the introduction of

scientific thought into the practice of management and should become an arena for active and coordinated actions of social, scientific and economic forces.

O. K. Yelmashiv,
Candidate of Economic Sciences,
Izhevsk

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ACADEMY OF SCIENCES CHAIRMAN ADDRESSED

Novosibirsk EKONOMIKA I ORGANIZATSIYA PROMYSHLENNOGO PROIZVODSTVA (EKO) in Russian No 11, Nov 84 p 63

[Letter to V. A. Koptug, chairman of the presidium of the Siberian branch of the USSR Academy of Sciences, from Yu. A. Luzyanin, general director of the PO PTZ, V. S. Zhigulin, secretary of the party committee, and N. M. Polyakov, chairman of the trade union committee]

[Text] To the Chairman of the Presidium of the Siberian Branch of the USSR Academy of Sciences, Academician V. A. Koptug

Under modern conditions there is not a single large enterprise that can do without introducing the achievements of science into practice. This process becomes stronger each year.

In this connection, in December 1981 we addressed the management of the Institute of Economics and Organization of Industrial Production of the Siberian Branch of the USSR Academy of Sciences with a proposal concerning creative cooperation and, to our great satisfaction, we encountered mutual understanding a positive attitude.

During the course of 1982 the collective of workers at the institute did a large amount of work to render practical assistance to our association.

The participation in this work of highly qualified specialists from leading enterprises of the country along with the scientific associates deserves all kinds of approval.

As a result of the creative cooperation of science and production, a long-term comprehensive program was developed for increasing the effectiveness of the work of the production association Pavlodarskiy Traktorny Zavod. Even at the present time its implementation is contributing to improving the basic indicators of the work of the associations: increasing the rhythm and profitability of production, improving product quality and stabilizing the collective. Preliminary calculations show that the introduction of the

complex of measures proposed by the institute in 1982 produced an economic effect of 500,000 rubles.

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CONSULTATION REQUIRES LARGE-SCALE BUSINESS

Novosibirsk EKONOMIKA I ORGANIZATSIYA PROMYSHLENNOGO PROIZVODSTVA (EKO) in Russian No 11, Nov 84 pp 64-65

[Article by Ya. A. Leymann, candidate of economic sciences, director for science of the planning and design bureau for management systems of the Estonian SSR Ministry of Light Industry (Tallinn): "Such a Scale of Consultation Work Is Possible Only in Planned Management"]

[Text] I consider myself to be something of a specialist in management consulting: I have studied foreign practice, particularly in Finland where it is largely analogous to American practice, and I have developed consultation plans in conjunction with Finnish consultants. Along with my colleagues I am attempting to develop management consulting in our republic. My participation in the work of the group of experts at the Pavlodar tractor plant ended with an evaluation of the plan for consulting--this was the subject of my graduation project in the specialized faculty of the Novosibirsk State Institute.

This project turned out to be original. In the first place, in other countries, where consulting services are fairly expensive, it would simply be impossible to invite such a large number of consultants and, consequently, to handle such a large range of problems. In capitalist countries consultants prefer to help the most successful clients, thus reinforcing the positions of the clients and their own positions at the same time. They also have a wide range of problems when they consult their own affiliated enterprise, sending to it specialists in finances, sales and other specialists under the leadership of an outside consultant.

Methods of management consulting have been used in the USSR only in the last 10-15 years, and by the beginning of 1982 about 100 articles and brochures had been published on this subject. But I have never encountered anything like the experience of the Institute of Economics and Organization of Industrial Production of the Siberian Branch of the USSR Academy of Sciences. The same conclusion follows from an analysis of the materials from the seminar of socialist countries regarding management consulting which was conducted by the International Institute of Management Problems in November 1982. And there has been no project like this in the CEMA countries either. Thus one can speak of a real contribution to the practice of management consulting.

As does any large-scale matter, this project has certain difficulties. The first question: are comprehensive research and scientific recommendations enough to essentially improve the association's position? Is it possible to sharply increase the reliability of production within the framework of economic organization alone?

Further. A large group of consultants spent 2 weeks conducting diagnostic research; their summary information turned out to be interesting and filled with content. Even the large amount of attention that was devoted to discovering the potential for the introduction of the recommendations was inadequate for diagnosing this. In other words, not all of the possibilities of collective work were exhausted.

Then they compiled, processed and analyzed the questionnaire "Your Opinion." This stage was undoubtedly necessary. Even raising the question is a motivation for change. But the feedback was not very well thought out, that is, who should report to the subdivisions on the results of the questionnaire and the plans for the future, and when and how should they do this?

The intermediate report was submitted to the PO PTZ at the beginning of May. The work on drawing up the programs suggested by the consultants was under way in June. And summer was far from the most favorable period, which could not but have an effect on the results of all of the activity.

What general conclusions could be drawn? The institute's experience shows the usefulness of creating specialized consulting firms. But it is better for them to be small and at the same time highly qualified. Such organizations could enlist consultants from the outside as well, for a certain remuneration. Their nature is interdepartmental, but their base is scientific, and it is desirable for it to be academic. The very first problem development is the introduction of the long-range target-program approach. Taking into account the special importance of the competence of the consultants and the danger of compromising a new cause by adopting incompetent actions, it is necessary to adopt moderate rates for increasing the number of consulting organizations.

It is necessary to have extensive clarification of the essence and possibilities of management consulting. It is necessary to show that this activity involves a multitude of well-thought-out changes, that the intermediate report is more important than the final one, that changes in the organization should take place in parallel with training of the managers, and that the latter think as the consultants do, systematically and comprehensively, but in a narrower framework, and therefore the consultants must present their models taking the situation into account and they must begin with the small things.

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ACADEMICIAN LOOKS TO FUTURE AFTER EXPERIMENT

Novosibirsk EKONOMIKA I ORGANIZATSIYA PROMYSHLENNOGO PROIZVODSTVA (EKO) in Russian No 11, Nov 84 pp 66-67

[Article by Academician A. G. Aganbegyan, director of the Institute of Economics and Organization of Industrial Production of the Siberian Branch of the USSR Academy of Sciences (Novosibirsk): "The Scientific-Practical Experiment Is Completed. What Next?"]

[Text] The work of our scientific associates in conjunction with the workers of the Pavlodar Tractor Plant and other production workers seems to me to be very important. Its special feature lies in the attempt to consider comprehensively the problems of increasing the effectiveness of a large production association. Like other scientific institutions, our institute, in keeping with its specialization, deals more with individual problems: improvement of the organizational structure of management at enterprises, the development of cost accounting (khozraschot), the changeover to the Sigma Automated Control System, the reduction of personnel turnover, and so forth. We were the first to test and carry out the comprehensive approach when consulting with the Oktyubrentgen Association. This experience was generalized on the pages of the magazine EKO. In Pavlodar we tried to go further--we suggested using the target-program approach for improving business.

In my opinion, the main point of the consulting was that, while in no way taking away the initiative and casting no aspersions on the competence of the association's specialists, we were able to convince them of the need to work on our "wavelength." This is much more than simply conducting an investigation and submitting the report from it to the enterprise.

What does it mean to get the consultees on our "wavelength"? Let me put the question in a different way: Why does the enterprise need management consultants? The simplest answer is this: on the basis of everything that has taken place in the enterprise it is difficult to see the patterns, the new tendencies and the requirements that are appearing at higher levels. And they must be seen.

We became convinced of this in Pavlodar. What did our clients need? First of all they needed advice on how to rise above trivial current affairs.

Understandably, they acted on our advice independently, creating the corresponding management and executive agencies, and developing and realizing the programs. The target-program approach to management which was recommended by the consultants helped to straighten out all of the daily trivia.

Ordinary planning activity is not always appropriate for the problems that arise. Now it is necessary to sharply raise the scientific and technical level of production as well as its intensification, to have orientation toward the final result, to improve product quality and to be concerned about the social development of the collective. All this sometimes requires revolutionary transformations in management methods. It is not enough, for example, to set the goal of increasing the output of tractors, extracting coal or producing rolled metal. How does one correctly determine the ways of achieving these, provide resources for production, and prepare and stimulate the workers who are to carry this out? A specialist approach is needed to solve extraordinary, nonroutine, sometimes extreme problems--in this case, the target-program approach.

It is difficult for me even to imagine what would have happened if a sufficiently large group of consultants had been limited to recommendations each in his own specialty. There would undoubtedly have been some effect, but it would most likely have been insignificant. It was quite a different matter when they began to develop programs. They made it possible to see more fully all of the interconnections within the enterprise and the interrelations with its surroundings. The uncoordinated areas in ordinary line-functional management are revealed and eliminated. Within the framework of the program there is a smaller probability of adopting measures that contradict one another or failing to take future consequences into account.

The proposed approach solidifies the collective because of its clearly formulated goals, and this is extremely important. Fulfilling planning assignments for the volume of production, for example, of tractors can hardly be included among such integrating and consolidating goals. Goals that are established in the general and individual target programs of the association are something else: to improve the quality of the tractor and its operational characteristic; to improve working conditions for everyone who will work in it; to increase the profitability and improve the rhythm of production; and to raise the level of material well-being and cultural and domestic service for the workers. Carrying out such programs will increase the prestige of the enterprise and stabilize the collective. Production tasks will also be carried out more successfully.

Our cooperation has led to certain positive changes which have been discussed by its participants. And even if the achievements are more modest, it is important for the managers and collectives to be directed toward higher results, the more so since the ways of achieving them have become clearer.

Support from both practical workers and scientists makes it possible to speak with justification about the expediency of creating consulting firms,

including special consulting subdivisions within the framework of the Siberian Branch of the USSR Academy of Sciences.

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INVESTMENT PROCESSES IN PRODUCTION DEVELOPMENT DISCUSSED

Novosibirsk EKONOMIKA I ORGANIZATSIYA PROMYSHLENNOGO PROIZVODSTVA (EKO) in Russian No 11, Nov 84 pp 68-81

[Article by V. I. Kushlin, doctor of economic sciences (Moscow): "Development of the Production of Apparatus and Investment Processes"]

[Text] It was stated at the July (1983) Plenum of the CPSU Central Committee that "a unified scientific and technical policy is now acquiring decisive significance."¹ In keeping with the goals of intensification of public production, the party has set the requirement of consistently changing over in the development of the production apparatus from the creation and introduction of the individual machines and units of equipment to the development, production and mass application of highly effective systems of implements of labor. Even the next five-year plan, the 12th, as K. U. Chernenko emphasized at the February (1984) Plenum of the CPSU Central Committee, "should become the basis for profound qualitative changes in production, a five-year plan of decisive change in the matter of intensification of all branches of our national economy."²

Capital Investments and Economic Growth

In recent years, according to statistical data, introducing production capacities has become a decisive factor in economic growth. Thus in 1980 approximately four-fifths of the annual increase in industrial output was achieved as a result of the introduction of fixed production capital. But the growth rates of capital investments in the national economy have decreased appreciably. While under the 7th Five-Year Plan as compared to the preceding one capital investments increased by 44.9 percent, under the 8th they increased by 42.9 percent, the 9th--by 41.7 percent, and the 10th--by 28.7 percent. Under the 11th Five-Year Plan they will increase by 10.4 percent. Because of the limitation of capital investments, stable rates of economic growth are only realistic under the condition of increasing the effectiveness of investments and increasing the return from the production apparatus.

The socioeconomic effectiveness of public production in the USSR have been consistently increasing. The national income has been growing steadily and its rates surpass the dynamics of the number of people employed in material

production. The productivity of live labor is increasing systematically and the public well-being is improving.

Still, recently there has been an appreciable reduction of the economic return from investments. Thus while during the 1950s for each percentage point of growth of fixed production capital the national income increased on an annual average by 1.03 percent, during 1961-1965 it increased by 0.865 percent, 1966-1975--0.8 percent, 1976-1980--0.6 percent and in 1981-1983--0.55 percent. The capital-output ration between national income and products of the main branches of the national economy is increasing.

The causes of the slower growth of production and its increased capital-output ratio have repeatedly been noted and analyzed in economic literature. Among them are the objective complication of the conditions for extracting many natural resources, the assimilation of the eastern and northern regions of the country, the need to use a growing part of the capital investments for solving ecological problems, improving of working conditions and so forth. It is suggested that during 1981-1985 the proportional capital investments per ton of increase in the extraction of coal will increase ninefold as compared to 1976-1980 and per ton of coal--by 21 percent; for each ruble of increase in commodity output of instrument building--by 39.3 percent, and tractor and agricultural machine building--by 18.2 percent.

Recently in many branches the start-up of production capacities (during the course of construction, expansion and renovation of enterprises) has lagged behind the rates of capital investments. In a number of cases the growth of capacities has even decreased with an increase in capital investments (see Table 1).

We usually look for an explanation (along with aforementioned factors) in the shortcomings in the construction and assimilation of new production capacities: the dispersion of capital investments, the growth of incomplete construction, the increased costs of construction and installation work, the lack of completeness of the construction and start-up of facilities, and so forth. Of course it is impossible to deny the negative influence of these factors. But if one looks into it carefully, they characterize, as it were, a secondary layer of factors. And the primary layer, the most profound reason is the inadequate link between investment process and scientific and technical progress [NTP].

NTP and the Production Apparatus

Throughout the entire postwar period the scientific potential of production has been growing steadily. Expenditures on science have increased more rapidly than have capital investments in the national economy (see Table 2). But there has not been an adequate increase in the results of investments. There has been a tendency toward a reduction of the "capital return" (the ratio between the increase in national income during the 5 years and the capital investments in the national economy with a lag of a 5-year period), which has been reflected in the return from fixed production capital. According to calculations, under the 10th Five-Year Plan the capital return was two-fifths of the average output-capital ratio while, for example, under

the fifth five-year plan the former exceeded the latter by an average of one-fourth. In other words, the return from newly introduced production capacities turns out on an average to be lower than the return from the existing production apparatus of the national economy. One of the main reasons for this is that many of the projects on the title lists for industrial construction are not distinguished by a high technical level, and after they are introduced (with prolonged construction) they do not show appreciable economic advantages over existing productions. And this, in turn, is a result of the poor coordination of the realization of the achievements of science and technology with the utilization of capital investments, a result of the inadequate "scientific preparation" for updating fixed capital.

Table 1. Rates of Introduction of Production Capacities (Through Construction of New and Expansion and Reconstruction of Existing Enterprises) and Increase in Capital Investments in Various Branches of Industry, % of 1966-1970

	<u>1971-1975</u>	<u>1976-1980</u>
Electric Energy		
Capital investments	125.4	144.5
Start-up of capacities of electric power stations	106.4	98.9
Ferrous Metallurgy		
Capital investments	129.9	151.1
Start-up of capacities for producing prepared rolled ferrous metals	85.3	51.7
Machine Building and Metal Processing		
Capital investments	171.5	245.9
Start-up of capacities for producing turbines	131.6	71.7
Power transformers	73.1	36.5
Metal-cutting machine tools	118.1	59.5
Forge-press machines	97.5	159.3
Tractors	65.8	94.1
Motor vehicles	229.8	57.7
Ball bearings	116.1	69.5

Source: "The USSR National Economy in 1980," Moscow, "Finansy i statistika," 1981, pp 328-330; "The USSR National Economy in 1982," Moscow, "Finansy i statistika," 1983, pp 330-331, 341.

During the postwar period the resources invested in science have increased in an absolute sense. But their growth rates under the various five-year plans (Table 2) have had a tendency toward reduction. The total expenditures on science during 1976-1980 increased as compared to the preceding 5-year plan by 27 percent, in 1971-1975--by 65.9 percent, and in 1956-1960--by 97.4 percent. Under the 10th Five-Year Plan expenditures on science for the first time increased more slowly than did capital investments, which was especially appreciable when comparing the dynamics of investments in science with the

rates of capital investments in the active part of fixed capital. A continuation of this tendency would mean a reduction of the scientific reserve of the investment process.

Table 2. Dynamics of Resources of Science, Capital Investments and Indicators of the Effectiveness of the Development of the National Economy, % of Preceding 5 Years

	1951- 1955	1956- 1960	1961- 1965	1966- 1970	1971- 1975	1976- 1980
Expenditures on science	220	197.4	183.6	166.3	165.9	127.0
Capital investments in the national economy	189.5	187.1	144.9	142.9	141.7	128.7
Capital investments in the active part of fixed capital	191.7	206.3	164.9	147.6	147.6	149.5
Produced national income		162.7	140.8	143.7	136.3	127.7
Ratio between increase in national income and capital investments (with a lag of 1 five- year plan)		69.6	56.0	115.3	71.0	67.7
Output-capital ratio (from average annual amounts of national income and fixed production capital		102.5	90.1	94.7	90.9	87.3

On an annual average under the 11th Five-Year Plan approximately 140 billion rubles' worth of capital investments were made in the national economy, and about three-fourths of them were production investments. Many of the enterprises, shops and sections that were constructed and renovated fully embody the progressive achievements of science and technology and immediately after they are introduced they produce a significant socioeconomic effect. But there are still considerable capital investments which are used for increasing the amount of obsolete technical equipment and technology or are invested in less effective capacities. With the existing system of planning and statistical accounting for capital investments it is not possible to correctly evaluate the part of them which serves for the introduction of the results of scientific and technical progress.

That which in planning practice is included under the category "Measures for Scientific and Technical Progress" amounts to a relatively small proportion of the investments in the development of production. In industry, for example, these expenditures do not exceed 13-14 percent of the gross capital investments. Thus considerable resources for reproduction remain outside the plans for scientific and technical progress. Of course, during the course of the assimilation of capital investments the achievements of science and technology are realized, but this process ends up outside the field of vision of the organizations that are responsible for its introduction.

There has arisen an unjustified lack of coordination between the development of science and technology, on the one hand, and the process of updating the production apparatus, on the other. It is reflected in the separation of organizations that plan and organize these two processes and in their weak interaction. The separation is also reflected in the theoretical constructs which, as it were, provide a scientific basis for it. In certain theoretical developments, for example, it is suggested that the return from science be determined by itself, juxtaposing it to the effect from capital investments. It is asserted that investments in science are much more effective (3-4 times and more) than are capital investments in the production apparatus.

Such an approach frequently leads to accounting more than once for one and the same result or to unjustifiably imputing to one factor an effect which is provided by other factors as well and to a distortion of the role of various elements of expenditures. Science provides the proper economic effect only if the scientific achievements are not limited to experimental models, but are disseminated throughout the national economy, which is impossible without capital investments in the production apparatus.

A contradiction between the development of science and technology and the investment process, which leads to a reduction of the effectiveness of the production apparatus, is largely conditioned by the lack of satisfactory methods of planning and control of scientific and technical progress and the economic level of newly introduced capacities. Relying on significant capital investments, the economic organizations frequently do not know to what extent the resources provide for materialization of the progressive achievements of science and technology.

Indicators of Intensification

It seems to us that applying two consolidated indicators for describing investment activity in planning and research practice would contribute to overcoming these shortcomings. Let us arbitrarily call them indicators of intensification.

They are, in the first place, the coefficient W , which shows which part of the industrial capital investments (or start-up of fixed capital) comprehensively embodies the achievements of science and technology in production capacities which are significantly different from existing productions in terms of their technical and economic level. Such facilities, for the sake of brevity, will henceforth be called "intensive" since they create conditions for intensification of reproduction.

The coefficient W is calculated as follows: $W = K_i/k$ or V_i/V , where K and V are the amounts of production capital investments and the start-up of fixed production capital, respectively; and K_i and V_i --capital investments and the start-up of fixed production capital that are included among capacities of the intensive type.

Second, there are the E coefficients which characterize improvement of fixed production-operating indicators of the capacities of the intensive type as compared to the initial level. $E = A/A_0$, where A --the indicator (or group of

indicators) of such important input characteristics of the "intensive" production as labor productivity, output-capital ratio, proportional savings on materials and energy, useful properties of the new product per unit of expenditures, and so forth; A_0 ---the corresponding indicator for the initial level.

The indicators E and W are the two main reproduction factors of active influence on the output-capital ratio: 1) increased productivity and other operational properties of the system of means of labor (which is determined primarily by scientific research and experimental design work); 2) rapid distribution of new systems of means of labor in the national economy (which depends on the investment policy itself). They thus produce an instrument for coordinating the investment process with scientific and technical progress.

Taking advantage of qualified experts we should systematically evaluate the necessary and possible values of E, which characterize the technical and economic parameters of new productions compared to the existing ones. The coefficients are differentiated according to the kinds of objects and branches of production. Then, taking into account the tendencies of scientific and technical progress, one can establish the normative values of E. They could serve, on the one hand, as a reference point for selecting plans and, on the other, as an instrument for controlling the utilization and distribution of capital investments.

The application of these coefficients for selecting the variants and forming the plans for capital investments and control over their utilization will create conditions for active influence on the economic return from capital expenditures.

Indicators of intensification have been evaluated with conventional calculations for a 15-year period. For initial figures we have used the economic conditions that existed between the 10th and 11th five-year plans. It was assumed that the coefficient W increases from 0.4 during the base year to 0.7 at the end of the calculated period, and E--from 1.4 to 2.5, respectively. In the calculations we took into account the limited nature of labor resources, which required coordinating the introduction and removal of fixed production capital with the dynamics of employment and the processes of releasing workers from outdated productions in order to fully load highly effective "intensive" blocks of the production apparatus. We also envisioned an improvement in the organization of the planning, construction and reconstruction of production with a prevalence of a tendency toward increased costs of construction and more rapid achievement of projected indicators.

In keeping with the hypothesis that was adopted for increasing the coefficients E and W and several other indicators, by the end of the 15-year calculation period, the average annual rates of increase of the final output were at a level of 6.7 percent as compared to 3.5 percent at the beginning of the period. By the middle of the calculation period there was no longer a reduction of the output-capital ratio, and by the end of it the output-capital ratio even began to increase. Calculations thus confirm the conclusion that the main resources for the effectiveness of the production apparatus lie in

combining the processes of updating it with scientific and technical progress and in concentrating capital investments on "intensive" productions.

Concentration of Forces and Funds

Because of the retardation of the growth of capital investments there is a greater demand for efficient concentration of resources on a limited number of highly effective projects. The crucial problem of dispersion of capital investments pertains not only to new construction, but also to reconstruction and renovation of production capacities. Large amounts of resources are frequently required for the introduction and replacement of individual machines, units of equipment and sets of equipment, and for their capital repair. But work at the enterprises is frequently conducted in a scattered way among numerous sections, without fundamental scientific and technical preparation and with poor concentration of forces and funds. The introduction and withdrawal of means of labor are frequently determined entirely by the possibilities of arrivals of new equipment, the time periods for the service of existing equipment and so forth, and not by the interests of the development of the enterprise, association or branch as units of the national economic complex. Still practice provides examples of a progressive approach which is based on the principle of efficient concentration of resources among facilities in keeping with long-range plans for scientific-technical and socioeconomic development.

One of the examples of a consistent strategy of renovation with minimum capital expenditures is the organization of the reconstruction of production at the Pervouralsk new turbine plant. The experience of the Voronezh Production Association imeni M. I. Kalinin for producing forge and press equipment is interesting.³ They carefully developed in advance a system for assimilating new production capacities here, "tempered" technological chains are being created, and personnel are being drained. The night shift will be a reserve. In just 7 months the output of new pneumatic hammers was increased to 35 percent of the overall production of forge and press machines. During the course of technical re-equipment the new equipment is not scattered throughout the enterprise and mixed in with less productive equipment, but is concentrated in specialized sections.

The advanced experience in the organization of the production apparatus suggests the expediency of the so-called block method of stage-by-stage reconstruction of production.

How is this different from the ordinary practice of "uniform" updating? In the first place, by the clear-cut plan of stage-by-stage updating of the production apparatus in complete technological blocks. The program for updating is coordinated with long-term plans for the development of the corresponding enterprises, associations and so forth. In the second place, by the comprehensiveness of the work in the blocks that are being reconstructed with a concentration of resources. In the third place, by the preparation of a reserve of scientific and technical developments for reconstruction of the next blocks of the production apparatus. Because of the concentration of forces and funds and their purposive movement from one stage of construction to another, conditions are created for rapidly raising the technical and

economic level not only of each of the sequentially reconstructed blocks but, in the final analysis, of the production as a whole.

Such an approach has already proved that it produces good results. It should apparently be utilized more extensively when updating the production apparatus not only at the level of the enterprises, but also on the scale of the branches in the national economy. As we know, the technical levels of the enterprises are far from the same. Along with the new ones which embody the latest word in science and technology, there are productions that are half a century old and more, which have been working for decades without any radical technical restructuring. Certain productions and subbranches are there for becoming bottlenecks in the national economy. It would apparently be more rational to concentrate forces and funds primarily on rapidly re-equipping precisely these key units than it would be to follow the path of uniform and prolonged reconstruction of production along the entire front.

Machine builders, in turn, are called upon to create not individual new machines, but highly effective systems of means of labor and technological complexes. One can learn from the practice in organizing production and delivery to construction sites of sets of equipment with a high level of plant and installation readiness (including technical equipment produced by enterprises of other ministries) which has taken form since the end of the 1960s in the Ministry of Chemical and Petroleum Machine Building. Such organization of the matter contributes to improving the quality and increasing the durability of equipment, and reducing the cost and accelerating the creation of production capacities. It is not yet sufficiently widespread although, by a decree of the Gosnab, Gosplan and USSR State Committee for Prices, in 1981 special provisions went into effect concerning comprehensive deliveries of equipment, which envisioned certain stimuli and criteria. Would it not be a good idea to augment the existing stimuli in such a way that in the production plans for machine builders a special line would be used to indicate the positions and indicators for the output of complete technological complexes?

When updating the production apparatus, on the one hand, it is necessary to have rapid and flexible restructuring of production and, on the other hand, functioning of the production apparatus as a unified complex. The latter can, apparently, increase the inertia of the production apparatus. The application of the so-called module principle in technical systems will help to resolve this contradiction. This means the utilization of unified components and sets of equipment--easily replaced modules. Such an approach is envisioned by the decisions of the 26th CPSU Congress and is already becoming widespread in the production of electronic equipment (for example, microprocessor systems of the Riga VEF Association imeni V. I. Lenin), in instrument building and so forth. There are real prospects for aggregate-module structures in robot equipment, in the creation of multi-operation machine tool complexes with numerical program control, adjusted technological fittings, and so forth. But on the whole the scope of their utilization can be rapidly increased. The dissemination of the module principle in machine building with an orientation of systems that are controlled by microcomputers qualitatively expands the possibilities of automating small-series production (the proportion of which, as we know, is increasing) and increasing its technological mobility.

Internal Reserves

Accelerated updating and raising of the technical level of the production apparatus is economically justified with a corresponding growth of its operational load. There are immense reserves here. But their realization should not be interpreted simplistically. It would be wrong to assume that improving the utilization of existing fixed capital requires no expenditures. There sometimes arise social problems which are difficult to resolve, for example, when organizing a third shift. Frequently, in order to load the capacities, along with additional operational expenditures, no small amounts of capital investments are needed: for reorganizing equipment, restructuring and rearranging sites, expanding transportation systems and auxiliary subdivisions, and organizing production and domestic services.

One of the methods of increasing the load on the production apparatus consists in increasing the coefficient of shift work, to which attention was drawn by the December (1983) Plenum of the CPSU Central Committee. In machine building it has remained for a long time at the level of 1.33-1.35. The reserve of metal-cutting machine tools has long exceeded the number of machine tool operators. According to existing data, in 1960 the number of metal-cutting machine tools in the national economy exceeded the number of machine tool workers 1.2-1.3-fold, and in 1970--1.6-1.7-fold.⁴ This tendency has not been surmounted even today.

Analysis shows that improvement in the utilization of means of labor frequently relies in one way or another on the complicated problems of their structure, problems which cannot be solved by operational measures alone, without becoming involved in problems of a reproduction nature.

In order to increase the effectiveness of the production apparatus, it is necessary to improve its structure:

to eliminate "bottlenecks" in the technological cycles which impede increasing the output of the final product;

to concentrate units of equipment that are scattered today (including universal equipment) in technological complexes which expand the sphere of multi-machine tool service. It is necessary to have standard plans for these complexes; to organize the output of unifying components, fittings and communications and control devices;

to strengthen the system-forming role of computer equipment, robots, and devices with numerical program control in comprehensive application of ordinary equipment;

to improve forms of redistribution of equipment (to regularly draw up centralized registers of surplus and reserve equipment, to organize the network of bases for redistribution of technical equipment and so forth).

In order to improve the production apparatus, other structural and technical factors and reserves are also important. Prof S. A. Kheyman has written

about these.⁵ We are speaking about creating productions that specialize in industrial repair of equipment, the manufacture of fittings (including nonstandard ones on orders from the enterprises), centralized output of blanks, parts and components for general machine-building purposes, and so forth.

The reserves for increasing the return from production resources are practically inseparable from the sources of further development of the production apparatus. The major and inexhaustible factor in its effectiveness is acceleration of scientific and technical progress. Therefore one should place at the top of the list advancing the organic combination of the investment process with systematic introduction of the achievements of science and technology.

FOOTNOTES

1. Materials of the Plenum of the CPSU Central Committee of 14-15 June 1983, Moscow, Politizdat, 1983, p 10.
2. Materials of the Extraordinary Plenum of the CPSU Central Committee of 13 February 1984, Moscow, Politizdat, 1984, p 16.
3. Materials concerning the experiment of the Voronezh Association will be published in one of the next issues of EKO (editor's remark).
4. PLANOVoye KHOZYAYSTVO, No 9, 1980, p 102.
5. See EKO, No 5, 1980, pp 32-52; No 6, pp 56-81.

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ROUND-TABLE DISCUSSION ON COMPUTERS IN SCHOOLS

Novosibirsk EKONOMIKA I ORGANIZATSIYA PROMYSHLENNOGO PROIZVODSTVA (EKO) in Russian No 11, Nov 84 pp 82-105

[Round-table discussion: "Electronic Computers in the School--A Reality of Our Day"]

[Text] The main part of the labor biography of those who are in the primary grades will come in the next century. Labor then will be much more complicated and the requirements for training of personnel will be higher.

In order to satisfy these requirements, even now, as was noted in a decree of the CPSU Central Committee of the USSR Council of Ministers (April 1984), "On Further Improvement of General and Secondary Education of Youth and Improvement of Conditions for the Operation of the General Educational School," to organize in the senior classes of schools, vocational and technical schools and secondary specialized training institutions the study of the fundamentals of electronic computer equipment so as to instill in the pupils the habits of using computers and to arm them with knowledge concerning extensive application of this equipment in the national economy. To do this, it is recommended that we develop a special course for pupils, that we create the necessary textbooks, training aids and school and interschool laboratories, and also that we use computer equipment from base enterprises and other institutions for training purposes. Research must be conducted on psychological and pedagogical problems related to the introduction of computers into the training process of general educational schools. Their results will be reported in 1986 to the CPSU Central Committee and the USSR Council of Ministers.

In the "round-table" discussion that is offered for your attention we consider problems of introducing electronic computers into the training of schoolchildren. What can be expected if today's plans of scientists and educators are carried out? Let us listen.

Participating in the discussion were:

Yu. P. Varonov, candidate of economic sciences, Institute of Economics and Organization of Industrial Production of the Siberia Branch of the USSR Academy of Sciences;

N. G. Zgoruyko, doctor of technical sciences, professor, Institute of Mathematics of the Siberian Branch of the USSR Academy of Sciences;

S. I. Literat, candidate of pedagogical sciences, physics teacher in School No 130, Novosibirsk;

L. B. Naumov, doctor of medical sciences, professor, Novosibirsk Medical Institute;

Yu. A. Pervin, candidate of technical sciences, computer center of the Siberian Branch of the USSR Academy of Sciences;

D. Kh. Rubinshteyn, doctor of pedagogical sciences, Novosibirsk Pedagogical Institute;

A. A. Tret'yakov, teacher of literature, senior scientific associate of the Scientific Research Institute of Complete Electric Drives of the Ministry of the Electrical Equipment Industry, developer of the school computer;

L. B. Efros, candidate of technical sciences, institute of automation and electric measurement of the Siberian branch of the USSR Academy of Sciences.

Before the beginning of the discussion a corresponding member of the USSR Academy of Sciences, A. P. Yershov, who led the discussion, familiarized the people in attendance with the division of information equipment of the computer center of the Siberian Branch of the USSR Academy of Sciences of which he is in charge.

A. P. Yershov: On the eve of the third millennium industrial countries are all arriving at the end of a second industrial revolution which involves automation of information processing. We call this stage complete information saturation of the society. This means that all necessary information will be stored and circulated in the society with machine carriers, and it will be processed with electronic computers and their software.

Complete information saturation is a phenomenon of immense scope. For a country with an active population of, say, 250 million (working or studying), the number of accesses to the national network for transferring information will amount to the hundreds of millions (that is, dozens of times more than there are telephones now), the number of built-in microcomputers--billions, universal computers--millions, and personal computers and automated work positions--approximately 200 million (one machine for each active member of the society). This means that the role of the computer in daily life will become comparable to the role of the automobile, the television set and the book, and the automated machine will be turned into the main partner in practically every working station.

The arrival of the computer in the school is inevitable, for it is a necessary constituent part of the information saturation. The school must assimilate the computer as an object and means of training, and it must be the first machine to be used, and programming should be a second kind of literacy.¹

In the computer center of the Siberian Branch of the USSR Academy of Sciences for 8 years now we have been investigating problems that arise with the utilization of computers as an organic object and means of school education. The methodological position that has been developed as a result of this has been formulated in the form of theses.

Thesis 1. The electronic computer is not simply another technical means of training and the sum of certain cognitive factors which must be added to the child's load. It is a person's partner throughout life. Familiarity with it begins in the school.

Thesis 2. For the school there is practically no lower age limit for beginning to become familiar with the computer. It is necessary to teach communication with it, like swimming, as early as possible.

Thesis 3. It is not enough to work with the computer as with a "black box": press the button and see what happens. A principle defect in programming training lies in the fact that in it the initiative in communication has been with the training program. Regardless of the child's age, the machine should offer him the opportunity of creative activity and realization of initiative (in contact with adults wherever this is necessary).

Thesis 4. Work with electronic computers should be mainly individual, with the exception of those cases when group activity is pedagogically motivated or economically conditioned.

Thesis 5. School information science in the narrow sense is the knowledge and ability acquired by children in connection with electronic computers either within the framework of an individual discipline or when applied to other subjects (mathematics, physics, foreign languages) or as an element in the school situation. School information science in the broad sense is the entire group of problems that are studied by teachers, methodologists and engineers regarding school education and by administrators in connection with the computers' penetration into the school.

The course in school information science in the secondary school is divided into three periods.

Initial--the capability of partnership (7-10 years). Information on information science is combined in a general course of primary education. The child learns to work with a computer in a way similar to how he learns reading, writing and arithmetic. The basic task is to ensure by age 11 a level of intellect that includes combined thinking, mastery of writing, and the ability to construct a structure of actions and to organize the data necessary for this. These skills are now developed at an average age of 14-15.

The operational situation of the first period is based on the programming language for primary education.

The training period--literacy in the area of information science (11-14 years). This subject is an independent and separate one, and its goal is to provide the child with a complete system of knowledge and abilities which enable him to utilize computers actively and apply them for his own goals, that is, to develop the ability to utilize the machines for a specific purpose. The corresponding language of the operating circumstances is training-production.

The business period--the ability to apply them to professional activity (15-17 years). New knowledge in information science is given only to those people who select this as an occupation. For the remainder main reliance is placed on the development of the ability to use computers for a specific subject in training and in labor education. During this period it is possible to become familiar with production languages, programming systems and so forth.

The majority of school computers have Basic as a programming language. But there is reason to think that Basic is not suitable either as a training-production language or as a language for primary training. The organization of data is no less important for the fundamentals of programming than is the organization of actions, and basic does not have this. The numerical applications for which it was invented comprise only a small part of the application of ideas of programming.

Thesis 7. Personal computers which are joined together into a local network within the class are a configuration which is preferable to the system of time sharing.

A New Worker--Readiness To Work With Computers

Y. P. Varonov: The time of becoming accustomed to the computer is passing, and a period is arriving when it will be necessary to work along with it, although the idea of universal automation has not yet been realized. The situation is developing so that there will be more users than there are programmers, operators and operating engineers taken together. And this is the way it should be. Obviously, under these conditions training with computers should include getting the individual accustomed to his new position in production and to the new division of functions between man and machine.

Response: We know what the division is: the machine is to work and man is to think!

Yu. P. Varonov: In many spheres of human activity the introduction of computer equipment does not mean direct facilitation of labor. The initial perception of the computer as a large arithmometer has disappeared into the past. Computer operations themselves comprise an insignificant proportion of the other various applications of it. Once on the pages of the magazine ELECTRONICS, one of the leading American specialists said that it is no longer possible to imagine the entire significance of the application of microcomputers in the future. And he gave this analogy: when the first

electric engine was invented everyone regarded it only as one of the means of facilitating physical labor. But if at that time somebody had said that it would be possible to make a toothbrush with an electric engine they would have laughed at him.

So far we are not fully aware of the entire area of application of computer equipment in various spheres of production activity. But from the practical applications we have seen, one can predict there will be a considerable change in the requirements placed on the worker when a computer appears as his partner at his work station.

Response: It is still a long time until then!

Yu. P. Varonov: Microcomputers are rapidly coming to the work stations, and a lack of preparation for working with them sharply reduces their effectiveness. At one of the enterprises which has a large amount of labor they received a new galvanizing line. Having become familiar with the technical specifications, the plant technologists discovered to their amazement that it is controlled automatically by a microprocessor. Then they were even more surprised when they learned that they had not received the programs for the microprocessor and that they cost as much as all of the "iron" they had acquired. It was necessary to bypass the control system so that it would not get in the way....

Response: The reason for this was not only a shortage of trained people; the main thing here was irresponsibility.

A. P. Yershov: Certain people should look after responsibility and others should look after the provision of personnel for computer equipment. The scope of its introduction makes it impossible to be limited to the framework of special training any more.

The Minvuz, Minpros and Glavprofobr are obliged to rearrange their work in such a way as to train the necessary number of specialists who are capable of intelligently utilizing computer equipment in all spheres of the national economy. The USSR State Committee for Science and Technology is preparing a program for total introduction of computer equipment in all spheres of education. And the leading institutes of the Minpros--the Scientific Research Institute of School Education and Technical Means of Training (NIIShOTSO) and the Scientific Research Institute of Content and Methods of Training (NIISIMO)--have submitted to the presidium of the USSR Academy of Pedagogical Sciences a program of scientific research which relies to a considerable degree on the concept of the creation of a computer laboratory in each school and planned introduction of computers into training. There is the hope that by 1984 we will have principled solutions that are calculated for the period up to 1990.

Response: It is a long way from principle decisions to the student....

A. P. Yershov: In the opinion of the minister of education, M. A. Prokof'yev, by the year 1990 computer laboratories could appear in a considerable proportion of the schools of the Soviet Union (one laboratory in each of

them). This is a beginning. But it is a serious beginning. Their creation will require a sum of money which considerably exceeds the present overall allocations for technical means of training.

Question: And what is the situation with technical means of training?

A. P. Yershov: The Ministry of the Radio Industry has prepared for series output a personal computer entitled Agat which was developed especially for the schools. It is compatible with the system of commands of one of the most popular computers in the world--Apple. The Agat costs about 3,000 rubles, but its price will drop with time.

Within the framework of the state plan the USSR State Committee for Science and Technology and Gosplan gave the computer center of the Siberian Branch of the USSR Academy of Sciences the assignment of developing a package of applied programs for forming a base operational system for the primary and the study periods of training. In the 1983-1984 school year in two schools (in Novosibirsk Akademgorodok and in Moscow) the first two experimental computer laboratories in the country were opened up. Each will have 20 Agat computers installed in it, one machine for every two seats. Additional lessons in information science (4 hours a week) will be conducted initially only in the fourth and seventh grades for development of the initial and the training periods. The training programs will gradually be developed for individual lessons in various disciplines (foreign language, mathematics, geography, history). Other classes will come to demonstration lessons from time to time. Extracurricular time can be used for the work of groups and the school of young programmers.

In 1982 the USSR Ministry of Education made a principal decision concerning gradual extensive introduction of microcomputers into the system of education as a technical means of training and in object of knowledge. This decision created favorable prerequisites for the formation of a national program for the initial period of the electronic computers into the schools during 1983-1990. This period, in turn, naturally breaks down into the initial (3 years) and working periods (5 years).

Here is a possible scenario for the development of events.

The 1983-1984 school year. Two experimental computer laboratories. The first experience of the initial period in the fourth grade and the training period--in the seventh. The preparation of 20 teachers and 20 students of pedagogical VUZes who have mastered the system "Schoolgirl" and the methods of working in computer laboratories. The development of 20 training programs in three to four subjects.

The 1984-1985 school year. Ten computer laboratories in experimental schools and as many in pedagogical VUZes. Experimental textbooks will be published for the initial (fourth-fifth grades) and training (seventh-eight grades) periods. And also an experimental VUZ textbook. The training for practical work of 200 teachers and 500 graduates of pedagogical institutes. The development of about 100 training programs in four-five subjects.

One hundred computer laboratories in schools of the large cities and 50 in pedagogical VUZes. Stabilization of schools and pedagogical VUZ textbooks on science. The development of methods for creating training programs so that the schools can create them. Complete sets of training programs for the initial period and in four-five subjects of the training period. The retraining of thousands of teachers and the graduation of the first class of the new type of instructors from pedagogical VUZes--they have mastered information science from the beginning of training in the institute. The first experiments in the advancement of the initial and training periods in the assimilation of computers to the junior classes.

L. B. Efros: But still it is not clear whether the people who will be actively utilizing the machines in their production activity will actually need to have a knowledge of the computer itself and the ability to program it. For, after all, it is not necessary to be a specialist in radio electronics in order to use such a complicated device as a color television or a washing machine with a built-in microprocessor.

I agree with the thesis of A. P. Yershov that the school should assimilate the computer as a means of training. But at the same time the assertion that the computer and programming should be subjects of school education seems questionable. In my opinion, programming is a specific area of activity which requires the appropriate kind of mind and a certain inclination.

Perhaps the fundamentals of programming should be given in school, the same as the fundamentals of mathematics, singing, and physical culture. But when it comes to programming as a second kind of literacy, one must take into account the fact that in the school we do not learn the fundamentals of correct writing, but of reading and writing. It seems that with respect to programming this approach would lead to difficult consequences, approximately like those which would be produced in the school by a complete course in mathematical analysis and other disciplines without which a person with a higher technical education cannot be considered literate.

Programming is a second kind of literacy only for people with the corresponding occupational orientation. I dare say that secondary school children are not capable of engaging in programming. I can foresee the objection: "Schoolchildren are already engaging in this, and successfully." Yes, but these are schoolchildren like those who are studying in specialized in specialized schools. We have been taking the "cream of the crop" so far: there are 50-60 people who are glad to work and do it successfully. But here we are assuming that programming will be taught to everyone!

With respect to VUZes this statement is correct, and here we must take the most extreme measures. A modern specialist with a technical education (and some kinds of specialists in the humanities) must not simply have contact with computers (both schoolchildren and housewives can learn to do this as quickly as they can learn to turn the dial on a television set), but they must use the machine, take charge of it, and write programs for it.

As for schoolchildren, all efforts here should be directed toward giving them a real opportunity to have access to a computer. But in no case should we raise the question of mandatory teaching of programming in the schools!

There is another reason why I insist on this: pedagogical mistakes are third in significance among those which affect the destiny of people (after mistakes of diplomats and physicians). Experiments in pedagogy are very complicated and dangerous. We do not know how to teach programming even in VUZes. Professional programmers are still not ready to take on the risk and responsibility of leading the younger generation of schoolchildren. In my opinion, it will be 10-15 years before it will be possible to teach programming as a school subject without the danger of "crippling" the schoolchildren. But all the roads should be opened up to programming in specialized schools. In the school course for mathematics it would be good to introduce a section which familiarizes the students with the fundamentals of constructing algorithms, but not with programming.

A. P. Yershov: I do not know whether or not it is necessary to teach children programming as an individual subject or what class it should begin with. Perhaps it should begin in kindergarten. But I am firmly convinced that even now we should be making some decisions. We cannot avoid these issues: how many computers will we have, will they become man's companions, a new system of retaining the social memory, will they change the nature of productive labor essentially, and how will our children look within a couple of decades?

What New Aspects Do Computers Introduce Into the Training Process?

S. I. Literat: Even now there is no doubt about certain pedagogical possibilities of computers:

the utilization of computers for training and reinforcing knowledge (experiments in this area conducted in School No 130 in the Novosibirsk Akademgorodok in mathematics in the second grade and English language in the third and fourth grades show that the effect from the studies appreciably surpasses the results obtained by the traditional methods);

the utilization of microcalculators and computers for accelerating calculations when solving problems, in laboratory work and so forth. To be sure, in the interests of the children themselves it is more rational to use these only in the senior classes;

the verification of the students' knowledge by quizzes and questionnaires;

the individual work of the student on a computer when carrying out the assignments of the teacher. If the schoolchildren desire it, the machine can be used to study various faculty courses. We have already conducted such experiments with large groups of students who are independently studying programming and the fundamentals of mathematical logic. For example, a tenth-grader in our school, on his personal initiative, independently compiled a program utilizing the monitor of random numbers for modeling the well-known experiment of Rutherford in the dispersion of alpha particles;

accounting for the knowledge of students and the output of operational information to the teachers, administration, parents and the schoolchildren themselves;

the possibility of scientific organization of control of the training process and the creation of automated systems for control of the school.

A. A. Tret'yakov: In the opinion of one of the managers of the French national program for the computerization of education Prof J. K. Simon, an experiment which took many years in 57 lycees in France showed that training using computers has an advantage over traditional methods in only four cases:

with self-training and professional training;

to eliminate gaps in basic skills (reading, arithmetic and so forth);

when training children with physical and psychological shortcomings: this way they are given an additional channel of communication; when the pedagogue-enthusiast has the ability to transform a system of training which was planned for not having a teacher into a means for his own pedagogical thought and action, and thus to increase the effectiveness of his work.

Yu. A. Pervin: The pedagogical tasks for computerization of the general educational school which were considered by S. I. Literat can be classified in three main areas:

the development of an operational style of thinking in all students. This global goal is reached by conceptual means of information science and, as a program device, requires special language systems for programming which are intended for training;

increased effectiveness of teaching of all school disciplines without exception by using computers. In order to carry out these tasks training and orientation packages of applied programs are used;

essential activation of the training process. Here one needs programs which operationally gather information from the training positions and analyze it.

It is important to note that with the development of software all these tasks can be handled successfully by schoolchildren who are studying programming in the rayon school for young programmers in the Novosibirsk Akademgorodok. The training languages Robik and Rapira and the system of computer graphics which is oriented toward schoolchildren, Shpaga, have been realized by pupils and students who are graduates of this school.

The students have created many interesting applied programs for applying computers in the school. I shall name just a couple of them: the program model of a nuclear reactor; the laboratory work in chemistry which is presented in a display screen; the demonstration package of programs in astronomy; the training for carrying out arithmetic functions with multiple-digit numbers; and programs which test the knowledge of schoolchildren in the elementary theory of music. Such developments of the students are good

educational means which enables the schoolchildren to express their vital position in socially useful labor.

I should like to discuss separately the role of the computer in activating the school lesson. Every first grader comes to school filled with a conscientious attitude toward learning. But very soon he understands that the teacher is not able to check on his efforts. To do this it would be necessary to question about 40 pupils during one lesson. Thus originates a training strategy which is dangerous in the social plane--having responded for today's lesson, the student is not preparing for the next one (or for the next several). In the school computer laboratory where a personal microcomputer stands on each desk the teacher (or, rather, his computer) receives an answer to any question from every student. There is also the possibility of utilizing the direct information about the answers of the students and integrated information: about the course of the lesson, the degree to which the material is being mastered, the activity of the students, and so forth.

Teacher, Class, Computer

S. I. Literat: In foreign countries they are now discussing a great deal the problem of the dying out of the school and its replacement with individual training at home with the help of computers. But Soviet educators attach immense significance to the developmental aspects of school, the role of the collective and the teacher.

A. A. Tret'yakov: In this connection I should like to mention the danger of repeating the mistakes of programmed training. Let me remind you briefly of this concept. The training material is broken down into portions which the students study independently, checking their knowledge with control questions (assignments). Depending on the type of answer, the aids (or machine) send them to one line of the program or another. The student himself actually studies without the teacher. But in general, especially with young schoolchildren, the student needs above all to learn to work and evaluate his own actions.

Programmed training is not suitable not only because of the lack of preparation of the schoolchildren, but also because training in general is impossible without the participation of another person. In the opinion of psychologists, the highest psychological functions or the basic capabilities appear only when the individual has mastered not knowledge, but interhuman relations. Therefore trying to eliminate the teacher from the teaching process in programmed training is an attempt, I would say, to eliminate training itself, and the rearing and development of children.

S. I. Literat: Quite right. And although from the technical standpoint the robot-teacher is quite feasible for the student in the future, it will never be anything more than a source of information. And the teacher (we are speaking, of course, about a qualified educator) will always be an individual, someone with whom the child can speak. But if the computer is given the functions of developing skills, control and self-control, individual supplementation of knowledge, and so forth, the teacher will be relieved of many routine operations (reports, testing knowledge, developing skills and so

forth). He will be able to use this time for creative communication with the students, scientific work and recreation.

N. G. Zagoruyko: We must recognize that in the modern stage of the introduction of computers into management, the volume of routine work in the time periods for paperwork, unfortunately, are still only increasing. Apparently here we need to overcome some barrier of complexity, of convenience and of the level of development of software. Obviously, the same equipment and common software (for example, in a university) should be suitable for automating all kinds of activity: training, research work, and management of the VUZ. It is necessary to have a unified system:

which is capable of analyzing the course and facilitating its improvement;

which makes it possible to observe the training of each student personally and to take note of his activity and preparedness for the next assignment;

which helps to plan an individual schedule for the student in a particular subject, taking into account his strong and weak points.

The need for examinations will gradually disappear. But the machine will take over some of the routine work from the educator only when the user is able to communicate with such systems in a natural language and in a convenient form, including verbally, and not just via a keyboard.

D. K. Rubinshteyn: The computer will never completely replace the educator even though the very nature of the activity of the latter and the requirements made on the machine will change essentially.

Yu. P. Varonov: But still one sometimes comes across the opinion that the computer is replacing the worker, in this case, the teacher.

N. G. Zagoruyko: There is no need to fear that the teacher will sit idle while the students are glued to the monitor. Instructors of Novosibirsk State University who are already using computers know that throughout the entire class with a group, say, of 12 students, the instructor is in approximately the same conditions as the grand master at a game that is all being played at the same time. And he ends up feeling like a squeezed lemon. And yet the training load (in hours) remains formally the same.

Yu. Varonov: When visiting these classes I was struck by something else: the students are working very actively, and not only the intensiveness of their work, but also the psychological load increases. An awareness of the fact that the machine knows more can cause psychological trauma not only to the student, but also to the designer who is working with an SAPR (system of automated planning). For he has been told since trade school that knowledge of the factual material is the main thing which he must acquire, for which he must strive.

Frequently attention is drawn only to the partial appearance of the role of the computer in training. It does an excellent job with figures, and the schoolchild does not need to learn the multiplication tables by heart.... But

will it be possible to arrange it so that computers will know the chronological tables, chemical formulas, spelling and generally everything that is taught in school. If the student gradually becomes accustomed to the idea that he has at hand an entire reference book then why should he learn it? There is an electronic "crib" close at hand, and all one need do is learn to use it.

Response: From what you have said it follows that now is a time more for methodological experiments and not so much for extensive introduction of the computer into the school.

A. P. Yershov: We will not understand how to conduct a lesson with the help of a computer until computer equipment is installed in the schools. Progress is possible only through observing the mass creativity of the educators, the disclosure of new tasks, and so forth.

One must say that we now underestimate the immense intellectual resource of the Soviet pedagogical corps. Unfortunately, the nature of the work in the school is such that it impedes the application of creative efforts. But the situation is changing. Programming will make it possible to construct methodological lessons which will require nothing except inventiveness for their realization with the use of computers. This will be creativity in pure form. A lesson on a computer is either solving a concrete problem or achieving a certain goal or playing a game with the machine. All the student has to do is press a button in order to obtain the next portion of information. It is necessary to construct a logical system and play it through in several ways.

Response: it can also be a little bit boring to press buttons....

A. P. Yershov: Now it is difficult to pull a child away from automated games, but they reproduce extremely simple game situations. The possibilities of school computers will be considerably broader.

Response: But this requires not so much the computers themselves as developed software for games in school subjects.

Methodological Support. Teaching the Teachers

D. Kh. Rubinshteyn: In my opinion, three equally important and interconnected tasks provide for success in including computers in the training process: the development of technical equipment, methodological support for it and the corresponding training of educators for schools and pedagogical institutes. We are now relying mainly on technical equipment. But it is clear to everyone that technical equipment, once it is delivered to the schools, must be utilized effectively.

After it is finally clear how the technical equipment (Agat or other machines) will be used, it will be possible to conduct serious research on transforming the training material into a form that is convenient for using the computers. For today's textbook is not suitable for work with a machine. The creation of software which the schoolteacher will be able to use with the computer

laboratory, even when not all the material, but only a specially selected part of it is studied with a computer, is a lengthy and very labor-intensive matter. Here we should not forget about the difficulties of reproducing methodological software. We must not allow a situation in which each teacher must prepare this for himself.

A. P. Yershov: The computer makes it possible to prepare such material if one wishes to. And this will be the "golden age." Until it is available, I imagine the situation thus. All classes will go through the computer laboratory, say, twice a week for each subject. In each course a certain section will be selected for which a computer lesson will be compiled.

Question: Who will compile it?

A. P. Yershov: At first the "wise men" from the Scientific Research Institute for Maintenance and Methods of Training (NIISIMO). For such a lesson they will write methods which will be entered into the memory of the machine and, when desired, will be reproduced in the necessary number of copies. By the same method the teacher prepares for the lesson himself, and then conducts it with his students. The lesson is organized in such a way that on the screen each schoolchild plays out individual game actions with a dialogue and with emotional encouragement. All the actions are synchronized with the overall commands and pauses. There is no profanation in these games. That is at least a beginning.

D. Kh. Rubinshteyn: But I see the difficulty precisely in providing the teachers with such materials.

N. G. Zagoruyko: I share your fears. I think that we will have the same situation with school training programs as we have with those for VUZes. The world statistics and the experience of the Novosibirsk State University where I teach show: in order for a student to work fruitfully for 1 hour with a monitor the teacher must work 100-150 hours (methodological development). In NGU there are now 48 monitors. If they are distributed uniformly they provide approximately 40 minutes per week for each student in the first three courses. By the end of the five-year plan we plan to have 120 work stations, and by 1990--250. When we have 120 work stations it will be possible for each student to sit at a terminal for 3 hours a week, and when we have 250 terminals--for 6 hours. This is not so much. As distinct from this, it is possible to imagine an entirely different situation in which there are terminals everywhere, including in the libraries and dormitories, and the student will be able to spend as much time at the terminal as he wishes.

So 6 hours is a bare minimum. But what does this cost? In order for 120 terminals to operate normally and for the students 3 hours a week working intelligently at them, it is necessary to expand 540 man-years of teacher labor on the development of methods, and for 6 hours a week--approximately 100 man-years. But if one takes into account a 10-percent annual modification of the courses, it requires another 80 man-years to modernize them. This is the most expensive part of the project. In order to have it it is necessary to change the technology for the development of methodological aids. It is

necessary to have a machine system which would help the teacher who is not a programmer to write, adjust and improve training programs.

After 5 years these 250 positions will cost approximately 7 million rubles, but since they (the "hardware") will be used for many years (taking obsolescence into account), this is not very expensive. But 800 man-years of skilled labor--is significantly more expensive and practically unfeasible under our conditions. The good thing here is that we can and should take advantage of the fact that these developments are being sold and can be widely disseminated.

For certain standard base courses it is necessary to have an all-union library which would be supported by developers of all VUZes which teach the corresponding courses. We are thinking about unionwide cooperation. Here it is possible to take advantage of the experience of other countries. Organizations that enter into such cooperation will be obliged to send their developments into the unified center. They, in turn, will be able to obtain any of those that are available there. Thus the experience of each will become the property of all.

We must not forget about these difficulties. When discussing the distant future we must understand that it will require a great deal of labor and money even for the first steps.

Nikolay Grigor'yevich gave an impressive figure: 100-150 hours of work of a skilled methodologist per 1 hour of work of a student at a terminal. It would seem that the solution would lie in the creation of a national center for the preparation and reproduction of standard programs. This was the path that was taken for a while in the United States. The problem is that this path again excludes the teacher from the training. Yet everyone who has worked in a school knows that there are no two classes or lessons that are the same. Any halfway good teacher plans each of his lessons individually, selecting special material and constructing a special scenario. And it is impossible to foresee this centrally.

In my opinion, the solution lies in the creation of methodological support not ahead of time in the form of completed programs, but immediately before the lesson (or during the lesson) in the form of individual fragments which can be used on the spot. How can this be done? One of the types of such a fragment is the task which is used by the educator at least 3 times: for the development of the will of the students, for advancing in the subject that is being studied (theory through problems), and for diagnosing the development of their knowledge, abilities and skills. We are approaching automation of training, whereby the teacher will have the criteria for the difficulty of the task in these three areas and, taking advantage of these, will be able to formulate for the machine an assignment for the generation of texts of problems.

Such a program for the computer--"Task Generator" for the dynamics of linear movement which is being studied in the school--was created in 1981 by A. Ye. Khoperskov (Novosibirsk Branch of the Institute of Precision Mechanics and Computer Equipment of the USSR Academy of Sciences) for a technical assignment

of the sector of automated systems of training activity of the Scientific Research Institute of Complete Electric Drives (leader--V. A. Zhegalin). The program assumes that some of the tasks used in training, with certain parameters of complexity, can be generated with the help of the computer. In a second it generates 10 problems at seven levels of difficulty. The teacher can receive as many problems as he needs in the given lesson. And this is done for various subjects.

Response: Are such things possible in physics?

S. I. Literat: Yes, the "task generator" is being used successfully in physics lessons in our school.

A. A. Tret'yakov: We are speaking about training. Nobody says that it is possible to automate the posing of scientific research tasks. On the basis of the developments of A. Ye. Khoperskov and the group from the Tallinn Pedagogical Institute under the leadership of Kh. F. Tammet, an associate of our sector, V. N. Kheyfets, is creating a consolidated version of the "task generator" which is suitable for all school subjects.

A. P. Yershov: And so the technical innovators are making technical equipment, the programmers are developing software (they are the first to see the new possibilities of the computer and strive to apply them where possible), and the enthusiast-educators are arming themselves with this software. The time has come when it is unthinkable for today's experiments to become widespread to any significant degree without mass training of teacher personnel.

D. Kh. Rubinshteyn: Naturally, for certain interested educators the additional training will not take much time. But as Andrey Petrovich correctly pointed out, it is necessary to have mass training and retraining of them as the schools are supplied with computers. And this is a serious matter which certainly cannot be taken care of quickly. Even now it would be expedient to introduce the appropriate courses into the training plans of all faculties in pedagogical institutes since we do not know which classes (with computers or without them) today's students will enter after graduation from the VUZ.

Question: But have the programs of the necessary courses been developed?

Yu. A. Pervin: Yes, such programs exist. For 5 years in the Barnaul Pedagogical Institute they have been regularly giving a special course entitled "Information Science for Educators." It envisions a large number of course and diploma projects both in programming and in teaching methods. The basic content of the course has also been discussed by students and teachers of the Gorkiy, Nizh-Tagil, Petropavlovsk and Kazakh pedagogical institutes and the Kazakh Pedagogical Institute imeni Abay (Alma-Ata). The Sverdlovsk Pedagogical Institute in the 1983-1984 school year was the first in the USSR to begin to train students in a new specialty--"Programming Teacher."

Still one cannot but agree that the task of teaching programming in the pedagogical VUZ is still a long ways away from the solution which is required

by our times. All pedagogical institutes of the country need a fundamental base course of programming, a course in methods of teaching programming, and courses in programming (perhaps faculty courses for the time being) for nonprofile (nonmathematical) faculties, as well as computer laboratories supplies with first-class equipment....

L. B. Naumov: I would like to draw your attention to the fact that now computers are being used by enthusiasts in training only in large cities. And in the future too this work is to be carried out in large cities (from individual experimental schools to hundreds of others). But one cannot ignore the fact that many of our schoolchildren are studying in poorly equipped rural schools. The difference in the initial starting level of education between urban and rural use will increase even more. And it is still too early to expect that computers or even terminals from one or several rayon (interrayon) computer centers for school training will appear in rural schools in the foreseeable future.

Therefore we must not forget about alternative approaches even though they may not be fully equivalent to computers, as long as they make it possible to provide effectively "by hand" a high level of education and the ability to carry out efficient and intelligent actions in solving any training and production tasks by school children of villages, workers' settlements and small cities. Here, in my opinion, the methodological training complex is irreplaceable (which teaches algorithms, programming training and didactic games).

This has already been discussed on the pages of EKO.² These three most important principles and methods of optimal training are possible both in the "manual" and the "paper" variants, and therefore they are accessible for any peripheral school. Naturally, to do this it is necessary to create and publicize new programming textbooks which contain solutions to the corresponding problems.

Yu. A. Pervin: Yes, today, when far from all schools have access to computers, one of the possible forms of training in programming is group use of computer equipment and mass organization of groups of young programmers. Management agencies in the regional centers are now able to allot computer equipment for the needs of schools and thus even today it is possible to accelerate the computerization of the system of public education.

A. P. Yershov: The problem of introducing computers into the schools is diverse and multifactoral: methodological devices, the role of the teacher, the immense layers of psychological substantiation, and so forth. It is necessary to accelerate the psychological maturity of the adolescent, to make training a source of positive emotions, and to increase its activity, intensiveness and inventiveness.

Research and experiments show that the computer is not counterindicated in solving crucial problems facing pedagogy. Therefore I think it will be correct if we arm ourselves with the most varied hypotheses and begin to work in this direction.

FOOTNOTES

1. One can become more familiar with the author's point of view regarding this issue and EKO, No 2, 1982: "Programming--A Second Literacy."
2. "Knowledge and Ability. The Goals of Professional Training and Methods of Achieving Them," EKO, No 5, 1979; L. V. Naumov, "The Discussion is Ended. We Must Solve the Problem," EKO, No 5, 1981.

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ROLE OF COMPUTER MONITOR IN MODERN LIFE DISCUSSED

Novosibirsk EKONOMIKA I ORGANIZATSIYA PROMYSHLENNOGO PROIZVODSTVA (EKO) in Russian No 11, Nov 84 pp 106-108

[Review of Foreign Materials Prepared on the Basis of the Collection "The Condition and Tendencies in the Development of Ergonomics," Moscow VNIITE, 1982: "Man and Monitor"]

[Text] Each year there is a larger number of people working with computer monitors. In the United States they are used by about 10 million people, and by 1990 this figure will have increased to 25 million. By that year in the FRG every 10th specialist will be working with a computer monitor. Research conducted by the American Simmons Company showed that in large industry one can simplify and standardize approximately 30 percent of all kinds of office work and, with the help of computers, automate 25 percent of the labor operations.

Computer equipment is being included in almost every building. But specialists hold the opinion that, as before, it will be oriented mainly toward conveniences for the designers, and not for the users. Indeed, it is difficult and sometimes impossible to completely figure out the mass of information, and a good deal of time and money goes for redesigning systems, studying and utilizing complicated languages, and superfluous documentation. Reflections on the screen, and incorrectly selected background and sizes of letters, keyboards that shine, and a position that is uncomfortable for the operator all reduce the effectiveness of the work of the operators. An analysis of 35 computer terminals produced in the United States showed that not a single one of them satisfies modern requirements of ergonomics. How is this explained? Largely by the fact that the majority of problems related to the human factor appear only in the process of operating the technical equipment.

Very soon various kinds of computer equipment will all be on approximately the same technical level, and on the sales market preference will be given to the kind that corresponds most to the capabilities and peculiarities of the user. The interaction of "man-machine" should be made more effective, and this is the main requirement of the 1980s in this area. The best success has been achieved, for example, by the Swedish firm DATASAAB.

Every second person who works constantly with monitors complains about eye fatigue accompanied by pain in the back and head. Moreover there is a disturbance of motor functions and hand-eye coordination, attention weakens, satisfaction with labor drops, and so forth. The problem has become so acute that an independent area has even appeared--ophthalmo-ergonomics.

When working with keyboards that shine the number of operators who complain about eyestrain and pain in the neck increases by one-third. Every second one will have a headache (and this happens with only 12 percent of the operators who are working with a keyboard with a dull surface). Color combinations are also important. In the System-41 produced by DATASAAB the color of the body of the monitor is close to that of the background on the screen. A special pigment is used which provides for optimal color of the letters on the screen. The brown background provides a calm contrast. As a rule, the function keys, as distinct from the others, are of a bright color. Specialists of the DATASAAB firm recommend using this color only when training the operators, since when they work with it constantly it quickly begins to irritate them. How does one make the function keys different? Sometimes by their shape and sometimes by their location. It has been noted that the productivity of the activity of the operators increases with a light background of the screen and a dark text on it, especially when it is necessary to always be switching back and forth between the copy and the screen. Reflections on the screen cause an essential discomfort. Of the operators who were questioned 85 percent complained about this. The DATASAAB firm applies a special coating to the screen, which keeps it from shining and from getting dirty. If necessary, the screen can be turned, slanted or even covered with a net. Correct location of the monitors in relation to windows and sources of artificial light, and also a dull surface for the table help to reduce the effect from this. But the design of the monitor frequently does not make it possible to adopt optimal decisions when organizing the work stations. Therefore the monitor itself must be selected at the same time as the equipment for work station is. As we can see, there are many problems.

Many countries are now developing ergonomic requirements for monitors, work stations and the organization and conditions for the labor of operators, as a rule, on the basis of experimental research. Fundamental guidelines and references are already appearing in this area, for example, in 1982 the FRG produced the reference "Work With Monitors." In it, in addition to ergonomic requirements and basic normative and technical documents, there is a special control chart. It helps to systematize and analyze the factors that affect the person who is working with the monitor and also to trace the reaction of his organism and load level.

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PROGRAMMING INTRODUCED AS SCHOOL SUBJECT

Novosibirsk EKONOMIKA I ORGANIZATSIYA PROMYSHLENNOGO PROIZVODSTVA (EKO) in Russian No 11, Nov 84 pp 108-114

[Article by Tat'yana Boyko: "An Ordinary Lesson in an Extraordinary Subject"]

[Text] A new subject, programming, was introduced in the 1983-1984 school year in the 166th School of Novosibirsk Akademgorodok in two fourth-grade groups and one seventh-grade group (2 hours a week) and in two groups of ninth-graders in the training production complex (6 hours a week).¹

The bell has rung and the ninth-graders are filling up the classroom. Their attitude toward the subject is reflected even in the desk they select. Those who are interested sit in the ones in front, and the passive ones push toward the "gallery" in the hope of remaining unnoticed. The class begins with the children's receiving their homework assignment: write two procedures--"Boat" and "Elephant," each of which should be produced on the monitor screen by entering fields which control the corresponding chess figure. Then the work is continued on the problem of editing the text which was not completed in the last session. Unclear places are clarified, questions are asked, suggestions follow, and some of them are accepted while others are criticized and rejected. The schoolchildren discuss in a businesslike way how to eliminate the superfluous gaps to the right and left of the given word, how to place the additions in the necessary position and how to eliminate the surplus. (But for us in the EKO editorial office the working instrument is still a pen, scissors, glue and typewriter...." Even in the first year of their study the students become familiar with the "internal world" of the computer. Thus there is a natural elimination of the psychological barrier with respect to "man-computer" which is typical of the older generation.

"Programming is in no way an exotic subject," asserts Yu. A. Pervin on the basis of many years of work with children in the school for young program operators under the computer center of the Siberian branch of the USSR Academy of Sciences. His statement is confirmed by schoolchildren of various ages: "It is the same as other subjects, with its stumbling blocks, difficulties and incentives. It is interesting to study it. But what about mathematics, physics, history--cannot the same be said for them?" One is more interesting, another less so.... Indeed, it is the same as in any other subject in the school course. As a rule, the picture of success is approximately the same in both mathematics and programming.

But these considerations, perhaps, pertain more to the theory of the subject. But practically all children change when they are in front of a computer, including those whose attention cannot be held by ordinary teaching methods. Or can one really remain indifferent when at one's command boring letters, figures and symbols from a notebook are transformed on a screen, say, into a multicolored working press. Or a figure 10 X 10 appears on the screen. Scattered throughout it are letters from which one can compose a word. One of the squares is occupied by an ant. (With this game the newcomer begins to become familiar with the Agat personal computer.) A boy who is so boisterous during the break is composed and concentrated before the monitor. He gives instructions--up, to the left, down, to the right--and the ant moves every letter into its place. No special problems arise. Another student who has barely "worked out" his part of the program immediately switches his attention: he begins to twirl a piece of iron which he got from somewhere and looks at the numerous pictures on the wall.... It turns out that for some of the children the ant worked for 5 minutes, while for others it only worked for 3. Why? The concept is mastered by the shortest path. The programs are adjusted.

The screen has gone blank, the ant has disappeared. But the visual result of their work, for example, the drawing, can be taken home. Is it difficult to make the machine draw? "Of course not," the 10th-graders like the fourth-graders answer unanimously. "Be attentive and precise. And that is all." Competitions for the best computer drawings have become a tradition in the 166th school. A jury evaluates not only the technical perfection of the program, but also the aesthetic merits of the drawing. Some children become so engrossed in this activity that they reject standard cards and send greetings to their mother, teacher or friends for a holiday or a birthday only with computer output. It is so much nicer to give (and receive!) a picture of a nice cat, the heroes of a favorite film or a robot one has made oneself!

The border between work and play is erased. With the help of technically simple drawings one can explain such important and nontrivial concepts of programming as the parameter, name, procedure, cycle, recursion and so forth. In passing and without its being noticed, the children become familiar with the fundamental concepts of mathematics, Russian and foreign languages. For instance, in a dialogue with a machine young schoolchildren actively and easily assimilate what is meant by a system of coordinates, graphs, functions and so forth, and they become convinced that one cannot make mistakes in writing programs, and not at all because the teacher will lower their grade. If a mistake is made (a semicolon is missed, the word "input" is misspelled, and so forth) and the computer immediately reacts: "does not compute...." It is impossible to go any further. The machine requests that the mistake be corrected, and if it is not it asks again. It, like a good educator, does not scold people for mistakes, but does give praise for correct answers.

It seems like a game to try to paste in their notebooks for all subjects white coupons printed on the Agat computer instead of the standard stamps which every schoolchild has long been used to filling out by hand. Any one of them could regularly provide them for all students in the class (and in the neighboring ones too). The fourth-graders who are writing the program "Label"

can see this clearly right in class. It is enough to make into variables such parameters as the name of the subject, the number of the class, and the last and first names of the student. By the end of the class a printing device has gone to work and the students have received a visible product of their labor--prepared labels. The reward for all their efforts is the proud awareness: "I did this myself. I can do it."

Theoretical knowledge, of course, is valuable, but one still receives greater satisfaction from work that is carried out with one's own hands. This is especially true when it can be useful to others. Schoolchildren fill production orders from institutes, enterprises and organizations. For example, in 1979 the eighth-graders of the 130th School of Akademgorodok Tolya Velichko and Tanya Vaynshteyn and the fourth-grader Natasha Kirpotina developed a dialogue information reference system called Bel'chonok for analyzing the primary structure of proteins. The primary structure of each protein can be represented in the form of lines which include from tens to hundreds of symbols. A protein has been received. How does one know if it is a new one or one that is already known? To go through all the known structures in the catalogues by hand is an extremely labor-intensive job, and it is not guaranteed to be free of mistakes. Bel'chonok remembers the structure of each protein that has been input into its system, the reference to the source in literature and comments on its physical and chemical properties. The machine compares the protein under study with all of those that are known and in a couple of minutes (and not days, as with manual work) it notifies them of the result that has been achieved, whose reliability is essentially increased.

The seventh-graders Anya Shklyayeva, Lena Pupkova, Natasha Glagoleva, Olya Khoroshevskaya and Tanya Vaynshteyn, with their information Knigolyub have considerably facilitated the complicated and labor-intensive work of exchanging books in the public movement of book lovers which is becoming very widespread in our country. Here is a sample dialogue between the book lover and the computer.

"Hello! I am the Knigolyub system. I am waiting for your instructions."

"I am looking for a book that interests me."

"Enter the name of the author and the title."

"Troyepol'skiy. 'White Bim, Black Ear'."

"This book is being offered by Kanonova, Mariya Antonovna. Seventeen Tereshkovoy Street, Apt 1. She asks in exchange: Iskander. 'Tree of Childhood.' I am waiting for your instructions."

"Put in the data about the book that is being offered."

"Give the name of the author and the title."

"Tolstoy. 'Immigrants'."

"Zhil'tsov, Sergey Stepanovich is interested in this book. Seven Morskoyprospekt, Ant 14, telephone no 65-12-18. I am waiting for your instructions."

"End."

"Good-bye!"

The system also has other capabilities.

In one of the laboratories of the Novosibirsk Institute of Organic Chemistry they conducted a large-scale experiment. The processing of the results that are received and the construction of the graphs of kinetic dependencies is extremely labor-intensive and painstaking work. An eighth-grader from the 130th School of Akademgorodok, Alesha El'chuk, wrote a program entitled Kinetika which makes it possible to automate this. The institute had been satisfied with the existing program. Could the laboratory workers through their own efforts automate the processing of the results they had received? "Naturally, if they had mastered the corresponding 'instrument'," answered Nina Aronovna Yunerman without thinking. She was the person under whose guidance Alesha had written a program. If they had mastered this....

Throughout 4 years of study in the school for young programmers Alesha did not distinguish himself by special success. "An average, normal child," thinks his mother, "and his interests are always changing. The club for young technicians was replaced by the school for young programmers, the guitar, swimming and so forth." Even for an adult programmer it is difficult to work out the details and bring their brainchild into working condition, not to mention for a child. When working on Kinetika there were plenty of reminders, urging and appeals on the part of his mother and Nina Aronovna not to abandon what he had started. An eighth-grader could hardly write a program that is perfect from the standpoint of a professional programmer (although the user was satisfied). But that is perhaps not the point here.

Boys and girls who simply communicate with the computer today recognize its possibilities, and later in their specific job they will already be accustomed to thinking (and, apparently, will easily find the correct answer): why not ask for the assistance of an old acquaintance--the computer? They will be able to solve successfully many problems which are beyond adults today. In the final analysis we are investing our main programs not in computers, but in our children.

FOOTNOTE

1. The classes are conducted by workers of the group for school information science of the computer center of the Siberian Branch of the USSR Academy of Sciences, Candidates of Technical Sciences Yu. A. Pervin, G. A. Zvenigorodskiy and N. A. Yunerman.

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SCIENTIFICALLY SUBSTANTIATED NORMS DISCUSSED

Novosibirsk EKONOMIKA I ORGANIZATSIYA PROMYSHLENNOGO PROIZVODSTVA (EKO) in Russian No 11, Nov 84 pp 115-123

[Article by I. I. Shkol'nik, candidate of technical sciences, and M. Yu. Garkavi, chief of the sector for normative management of the Khimprom Production Association (Slavyansk, Donetsk Oblast): "The Path to Scientifically Substantiated Norms"]

[Text] Does your enterprise expend material resources economically? Particularly raw materials, basic and auxiliary materials, and also energy. What do you need in order to respond to this question knowledgeably?

It is necessary to know the expenditure normatives.

It is necessary to know the actual expenditure.

It is necessary to have technical means in order to measure the actual expenditure in all subdivisions.

It is necessary to want to engage in this.

All this comprises the subject of our discussion.

Even under the most favorable conditions it is hardly possible to save on material resources without an analysis of the reasons why the actual expenditure deviates from the normed expenditures. The normative method of accounting for expenditures on production is considered to be the most effective and efficient. If the mathematical model of the process is well-developed and the information is processed on a computer, this method makes it possible to rapidly eliminate the factors causing the deviation from the normative expenditure of material and energy resources and the time, place and scale of the losses. Consequently, it becomes possible to eliminate on the spot and thus reduce losses of resources.

We Have Not Sat With Our Hands Folded

What was said above is trivial, but not outdated. One is convinced of this from the example of the Slavyansk Khimprom Association. It produces large

volumes of soda ash, caustic soda, calcium chloride, and chemically precipitated chalk. For mass consumption it produces four kinds of synthetic detergents, household soda, chalk for whitewash and other commodities in an amount of 36 million rubles (1983).

In this production with its large products list and many tons of products, from year to year there is a greater number of material resources for which expenditure norms are developed. The normative group created in 1979 as part of the production division systematically analyzes the expenditures of raw-material, processed-material and energy resources and their efficient utilization.

One must say that such operations do not take place at the enterprises painlessly, because the higher organizations frequently confuse the "planned" reduction of the expenditure norms with the "directive" ones. The manager sometimes needs a lot of courage when speaking about reducing expenditures norms. When receiving an unrealistic assignment he must prove to the higher-ups why it is unrealistic or "distribute" the figures among the shops, applying the so-called "boiler" method of accounting.

The general director of the Khimprom PO, V. A. Kolomiyts had to find within himself the power and--we shall not mince words--the courage when introducing normative accounting to go to the deputy minister and convince him and the corresponding services of the ministry that this approach was necessary. Thus they redistributed from certain kinds of products to others 15,000 tons of conventional fuel (11 percent of the annual consumption), 80,000 gigacalories of heat (6 percent) and 30 million kilowatt-hours of electric power (20 percent). Thus for the first time in 1980-1981 in the subdivisions of the association they learned to "spread" all expenditures of fuel and energy resources among the various products. Everywhere they installed instruments for monitoring the expenditure of materials to make sure that the accounts for them were correct.

The normative method of accounting for expenditures made it possible to establish on the spot the limits at which, because of violations of technological conditions, one loses output and expends excessive material and energy resources. Ordinary analysis of economic activity for the month, quarter and year has come to be combined with an analysis of the losses from inefficiency. Its scope and factors are now clearly visible. Such a combined analysis shows the managers of the association and shops where they should direct forces and funds in order to reduce expenditures on production.

Moreover a rejection of the "boiler" method of accounting for expenditures, whereby it is extremely doubtful how much raw and processed materials and fuel and energy resources the enterprise actually spends on the output of one product or another, aggravates the problem of scientifically substantiated planned and prescribed norms. Their portion and the overall number of existing norms is not great, but they are such that many collectives of the shops cannot achieve them.

The table shows the situation with respect to the fulfillment of scientifically substantiated norms in the association on 1 January 1983. It has not changed very much even now.

Kinds of material-energy resources

<u>Kinds of material-energy resources</u>	<u>Total</u>	<u>Including scientifically substantiated, projected and prescribed</u>	<u>Of these, actually achieved in 1982</u>
Basic raw material	124	91	55
Auxiliary materials	250	35	6
Energy resources	178	59	27
Total	552	185	88
In %	100	33.5	15.9

These ungratifying results can also be ascribed to the shop collectives that do not utilize their own reserves. But the development of scientifically substantiated norms goes beyond the bounds of the possibilities of individual enterprises and should be carried out by the corresponding scientific research institutes. They provide such norms for all kinds of resources, taking into account the concrete conditions of production. Unfortunately, there is no unified system in this important matter.

How Reduction Is Planned

The following system is in effect. For the main kinds of raw and processed materials of the products list of the Gosplan, the Ministry of the Chemical Industry and the VPO the reduction of the expenditure norms is included in the plans for organizational and technical measures. This same reduction is also envisioned in the plans for the norms for expenditures which are sent by the enterprises to the branch institutes. If the enterprise increases the expenditure norm it appends the corresponding calculations, which are checked and approved or rejected by the branch institutes.

Of course, the principle of this system is "from what has been achieved." As a result, the ministry's administration for science and technology prepares for the minister's approval new norms for expenditure and directive percentages of their reduction for each enterprise for each specific kind of raw material.

What is good in such a system from the standpoint of the enterprise? One need not fear that in spite of its capabilities someone will arbitrarily establish a directive percentage of reduction of expenditures. It envisions the possibility of defending one's positions: one can prove either the need to allot to the enterprise equipment and allocations without which it is impossible to reduce the norms, or the need to retain the norms that were previously in effect. The system, of course, does not operate automatically. It is necessary for one to go to a lot of trouble before succeeding in arranging for the accounting of the actual capabilities of the enterprise. But it is possible to achieve reasonable norms for the expenditure of raw and processed materials.

And What About Energy?

The situation is completely different with respect to planning the expenditure of fuel and energy resources--and this includes the fact that the European country does not have very many of them and it is becoming increasingly necessary to look to Siberia. All-union associations (VPO) annually and without any calculations or substantiations establish for the enterprises a directive percentage of reduction of the expenditure of energy resources. And this percentage is not small--an average of 4 percent per year. There is the conviction that the specific features of the enterprise do not affect the expenditure of coal, fuel oil or electric energy.

Arbitrary assignments for reduction and the refusal of higher organizations to accept technical and industrial financial plans without this reduction lead the manager, if he is not sufficiently courageous or eloquent, to bad practices. Not only the planning norms for the expenditure of energy resources for certain productions are reduced below the reasonable level (and by hook or by crook the norms for certain other productions are artificially raised), but the actual expenditure of fuel and energy resources ceases to be taken into account from the indications of the instruments. Directive norm-setting for fuel and energy resources which is not as substantiated with calculations and the actual position of the enterprises forces their managers to act in this way. We understand the difficulties with resources but we do not understand why they should be planned that way. For in the final analysis the country would achieve a much greater effect if the interests of the enterprise were taken into account.

For planning the expenditure of fuel and energy resources it is frequently suggested that we use the base system for accounting or modifying it. But the base system is unacceptable because of psychological factors which make the manager inclined to "get rid of" his enterprise's reserves, but gradually, in small portions. This means that the base system is not advantageous to the country. In spite of our praises for the system of planning the expenditure of raw materials from the main list of products, it is not effective enough either since with it the question of reducing the norms for expenditure is resolved by the enterprise itself, which is more interested in norms "with a reserve" than it is in scientifically substantiated norms.

Scientific Substantiation Is More Than Just the Average....

What needs to be changed in the system of planning the norms for expenditure?

The branch institutes, taking into account the concrete conditions for production, develop expenditure norms that are scientifically substantiated from all positions for basic raw material and certain kinds of auxiliary materials (cardboard, paper for sacks or wrapping, containers and so forth) as well as energy resources. Measures are earmarked which provide for reducing the expenditure norms which are in effect to the level of the scientifically substantiated norms, in the time periods within which this much be reached. It is necessary for scientifically substantiated norms (more precisely--technically substantiated) to be differentiated for each enterprise

individually, for there are new enterprises and there are old enterprises, there are those which are operating well and those that are not operating so well. And this is not because the managers are not good or that the collectives are poor, but because of a complex of both objective and subjective factors. If one were to apply the average branch norm for expenditure to all enterprises that produce one and the same product, it might turn out that the enterprises that are operating well have already surpassed it and, it would seem, would not have to work any more at reducing the expenditure norms.

Still we are not calling for a rejection of average branch norms, around which "an entire carousel is turning" now. Such norms are also necessary for planning at the level of the ministry and the Gosplan.

Comrade Gossnab, Do You Provide Or Only Check?...

USSR Gossnab organizations play a large role in planning expenditures and economizing on resources. Recently there has been a greater desire each year on the part of its territorial administrations to shift the center of its responsibilities from prompt provision of the enterprises with raw and processed materials, completely in keeping with the products list, to control over the expenditure of material and energy resources. Judging from our experience in working with the Donetsk Territorial Administration (and it is certainly not the worst one in the Gossnab system), neither the skills of the workers who keep track of certain products list, nor their employment, nor, finally, the notorious system of "base accounting," from which position they regard the state of affairs at the enterprises, provides for the proper control. Again it is a matter of a lack of scientifically substantiated norms. With all of its activity, it seems to us, the Gossnab workers must contribute to the creation of conditions which would preclude the desire of the managers to provide for themselves a peaceful life as a result of some fictive "base" norm setting.

We have occasion to encounter everywhere the tardy and incomplete provision of the enterprises with material and energy resources. At the same time, it is hard to find an enterprise where there is no surplus of material values or where their circulation is not too slow. Organizations of the USSR Gossnab try to fight against these negative phenomena. But this fight is not very successful. Why? The fact is that paperwork prevails in allotting funds and assigning them to particular suppliers. Now, with respect to a number of complex positions regarding raw material, the VPO plays the role of a petitioner in the higher levels of the Gossnab or the supply ministry. They are not engaged in their own business either. As a result there is a severe strain on the nerves, and palliative and sometimes contradictory normative and technical documentation for the replacement of materials and failures to meet production plans.

One Example: Where Are Ten Million Lost?

All this can be clearly seen in the Khimprom PO from the example of one material--cardboard for boxes. It is used for packaging washing products, soda and other chemical products. The annual expenditure of cardboard in the

Khimprom Association is 5,000 tons. This is approximately 3 percent of its consumption in the subbranch. The actual proportional expenditure and the existing expenditure norms are 15-20 percent higher than the technically substantiated norms which envisioned the use of carton of a certain width and thickness. The unavoidable losses during transportation, storage (damage) and adjustment of the automated equipment exceed 40-50 percent of these scientifically substantiated norms. Why?

The enterprise receives cardboard from four to five suppliers. They send cardboard of various widths, thicknesses and quality. USSR Gossnab institutions (territorial administrations) are not establishing long-term economic ties for reducing the number of suppliers. The second reason for the inefficient utilization of cardboard is the limited interpretation of the GOST's by the suppliers. Thus the width of a roll, according to the specifications of the supplier, is 530 millimeters while it would be possible to limit it to 510 millimeters (for the bicarbonate production). The third reason is the mistakes of the State Committee for Prices when determining the wholesale price of washing products in packages, for example, 350-400 grams in a package. The fourth reason is the small diameter of the spools on which the cardboard is rolled. When a roll of cardboard is unwound it becomes wrinkled and unsuitable for cutting and applying the stamp. And look how negligently the rolls of cardboard are loaded onto the cars or unloaded from them!

If these factors were eliminated it would be quite possible for the association to save 1,000-1,200 tons of cardboard, which on the scale of this country would amount to a savings of up to 30,000 tons or about 10 million rubles a year. But the suppliers of the cardboard and the organizations of Gossnab, Gosstandart in the State Committee for Prices as well as the enterprise are not bound together by a unified system.

But what kind of system is in effect then?

In Effect Does Not Mean Effective....

In order to overcome the shortcomings, one must be able to see them. In this case they are these:

the weak role of the branch scientific research institutes in the development of scientifically substantiated normatives and measures for achieving them;

the spotty application of the normative method of accounting for expenditures on production;

the lack of mathematical models for the utilization of resources at the enterprises plus the lack of instruments with high precision which would make it possible to utilize computers properly;

systematic violations of GOST's, OST's and TU by the supply enterprises;

the basis system of accounting when setting norms for expenditures;

the directive reduction of norms.

How does this system affect the managers of the enterprises? As a rule, they do not introduce scientifically a substantiated norm or they are extremely unwilling to decide to do this, even those which have been developed.

In addition to the cause-parameters which have been named and unnamed there are also purely human circumstances--the lack of desire to wreck one's nerves and to spend much time in the divisions of the Gosplan, the ministry, the VPO and other higher and associated organizations.

Let us conclude with a small example. We have had extremely convincing calculations--it is necessary to increase the norm for the expenditure of coke in the production of lime (for soda) from 188 to 202 kilograms of conventional fuel per ton of this product. It would take a year (!) of correspondence and negotiations in Moscow to get the matter off the ground. It would take less time to reduce the norm, but still while everything was being signed the production conditions could change. Thus in a number of shops the enterprise has reduced the proportion of manual labor and, consequently, the energy-intensiveness has increased. "From science" it follows that the expenditure of electric energy should be increased, but in practice again we are told "to reduce it...."

If the Khimprom Association during the time of its existence had carried out all directive "reductions," now it would not be consuming any electric energy, but would be supplying it to other consumers....

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RESPONSE TO ARTICLE ON ECONOMIC MECHANISM

Novosibirsk EKONOMIKA I ORGANIZATSIYA PROMYSHLENNOGO PROIZVODSTVA (EKO) in Russian No 11, Nov 84 pp 124-129

[Response from A. K. Semenov, chief of the division of analysis of production and economic activity of the Estonslanets Association (Kokhtla-Yarve) to the article by I. I. Usacheva, "The Economic Service of the Enterprise and the Economic Mechanism," EKO, No 1, 1983: "How Not To Be a Two-Faced Janus"]

[Text] Who does not know that the enterprise economist, like a Janus, has two faces: one is guarding state interests and the other is protecting the interests of the enterprise and its collective. This tactic in the economists' behavior is the stronger the less the goals of the state coincide with those of the collective and the individual worker.

Such "scissors" appear, as was correctly noted by participants in the discussion of the article by I. I. Usacheva, because of planning from what has been achieved, whereby, in the final analysis, the more one spends the more one is given, and the savings achieved through the efforts of the collective is subsequently removed. Everyone, from the foreman to the manager of any enterprise, asks himself a most difficult and so far unsolved question: What will happen if we were to mobilize and invest all reserves? Are there guarantees that they will not be taken away, and, because of this, the collective will not be included among the backward ones and be left without a bonus? Is it not better to save the reserves, even to the detriment of state interests?

This widespread economic situation is the most convenient loophole for inefficiency and for stealing from the state without committing a "crime." One is not judged for it, it is simply discussed.

Planning from what has been achieved and, consequently, the lack of scientifically substantiated decisions contributes to the flourishing, on the one hand, of autocracy with its administrative aplomb and arbitrary, frequently ill-considered decisions, and, on the other hand, it gives rise to impotence in management of the economy and helps to create conditions whereby people who do not know very much are "at the wheel" of the economy of the enterprises.

Is it really necessary for an enterprise to have an efficient economist if there is the hidden goal of not revealing and utilizing existing reserves, but concealing them and saving them for a rainy day? Is it really necessary to have analysis in order to reveal the internal reserves? A skillful administrator has more effect on the price than a scrupulous specialist does.

The head economist of the enterprise, with the diversity of his functions, tasks and responsibilities, with the need for personal contact with a multitude of higher and public levels, frequently becomes essentially an administrator for the government and only nominally for the management of the economy. This is why it has become possible to hire any other kind of specialist for the position of the economist. Of the 32 head economists who have held the post at various times at enterprises of the Estonian Association, 26 had never worked as economists before and did not have an education in economics.

While they were good production workers and excellent people, they were never trained for management of the economy. They did not manage to master its fundamentals and many of them after 2-3 years returned to work in their specialties. The frequent changing of the head economists was reflected in the economic condition of several mines and mining areas: under comparable conditions they began to lose the positions they had at one time won regarding proportional expenditures, production costs, labor productivity and so forth. And the merging of independent sections at the mines--planning and labor and wages--into a unified economic service under the head economist finally weakened these divisions.

The economy of the enterprise is a serious aspect of its activity. Not everyone can be allowed to do it, just as a stomatologist or neuropathologist cannot perform a heart operation in the place of an experienced surgeon-cardiologist.

Frequently in order to create a "base" for planning for the future, economists themselves give the command to write off from the warehouses the material values that are stored there, which can then serve dishonorable people as food for irrational expenditures or even for theft. The same motives cause them to include in the plan incorrect (lowered) economic effectiveness from the introduction of new technical equipment, efficiency proposals, and scientific organization of labor, and not to take advantage of all technological and production possibilities.

It is precisely in this case, when we are working against the economy and against its progress, that we do not allow the reserves to develop fully. Let us note that this is only a small tip of the iceberg of expenditures from planning from what has been achieved. The artificial economic well-being of the enterprise sometimes conceals a number of moral and social vices--"bath days," hospitality at the expense of production, valuable souvenirs, bribes and presents at state expense to representatives of various levels on which their well-being depends.

The large-scale economic experiment that is now being conducted in the country should strengthen the influence of economic methods of managing production and

put an end to planning from what has been achieved. The long-term stable normatives that are introduced should make the enterprises dependent on their own results of management and not on the goodwill of the higher levels, which is sometimes proportional to the niceness and the hospitality of the enterprise.

Under the conditions of the expansion of the rights and responsibilities of the associations, the requirements placed on the head economist increased significantly. But the economist is tested for stability not only in persistent searches for optimal ways of resolving the situations that arise. He must also avoid the temptation to be drawn into questionable or unqualified decisions related to wages. Such decisions appear especially frequently when there are insufficiently substantiated determinations of the effectiveness of the introduction of scientific developments, new technical equipment and technology, scientific organization of labor, efficiency proposals and payments of monetary remunerations for them. Here are a couple of facts.

For the 11th Five-Year Plan the branch of the Institute of Mining imeni A. A. Skochinskiy submitted to the Estonslanets Association plans for scientific developments with an overall economic effect of 3.6 million rubles. After they were attentively examined it was not difficult to show that the effect would be one-fifth (!) of that. The unsubstantiated increase in the calculations of the effect from the introduction of new technical equipment, technology and efficiency proposals just in the facilities that were inspected over several years could lead to overpayments of monetary remunerations in the sum of about 80,000 rubles.

The poor utilization of computer centers and the fact that they operated at a loss in small enterprises is well-known. But the methods for stimulating the introduction of new sections of computer centers and automated control systems is such that it has become safe to use the method of obtaining remunerations for an effect that is not concrete. The size of the "piece of the pie" has become dependent on the interested parties.

The scientific research laboratory for comprehensive problems of labor hygiene (Kirovsk) suggested to the association a scientific idea for reducing vibration injuries with an economic effect of 247,000 rubles a year. Its essence consists in periodic replacement of workers in the process of manual drilling, which we have been doing for a long time.

Particular instances? Not at all! There are quite a few of them. And the economist should oppose such "innovation." A real economist is essentially a fighter, and his position should be unshakeable when it comes to defending state interests. But he must have support. Moral! And material also!

The incentives for the work of the economist depend on the overall successes of the enterprise. This is correct. But how does one evaluate his personal creative efforts? Effective elements in technical innovations are rationalization. But here are innovations that are proposed in the area of the enterprise's economics and have no less of an economic effect--but they are not. There is no remuneration for them. But, after all, why? Are they pursuing other goals here? And are initiative and professional ability not

drowned out with this approach? And what about the psychological factor? Who does not enjoy receiving one more recognition of his mastery, usefulness or knowledge of the subject!

To elicit and encourage the creative efforts of an economist in production is far from a small matter. And then perhaps we shall cease to call economists those who are able to sign documents, represent enterprises in the organizations, straighten out the plan and the report, take capital investments from some and give them to others, handle expenditures for production cost, the wage fund and so forth.

Unfortunately, it is somehow not accepted to encourage the creative research of economists. When speaking about achieving economic results, people think that it is possible to limit themselves to control. To ignore the role of control is in general an unforgivable deception, but to make a habit of it is a double deception. It does not seem altogether justified when immense efforts and funds are expended on the organization of external control and not on the self-control of the enterprises and collectives.

In our association for every thousands workers control functions are carried out by 200 engineering and technical personnel and 36 employees, 12 workers of the quality control service, and 94 controllers' deputies, not including the controller who is in charge of the department, public organizations, the banks, financial agencies, the OBKhSS, the procurator's supervision and a multitude of specialized nondepartmental services. For one of the report periods (3 years) in a relatively small association such as Estonslanets, the people's controllers alone conducted 962 inspections. From their results 18 officials were called in for disciplinary liability and unauthorized expenditures were recovered from five workers--in the amount of 628 rubles. But now let us calculate what it costs the state to conduct these 962 inspections both from those who were inspected and those who conducted the inspections with such a modest result.... Are we not missing the point of control here? Is it really right to replace the effectiveness of control with mass application of it?

In my opinion, we need not so much to increase external control as to establish and strengthen methods of self-control: the creation of conditions whereby it becomes disadvantageous to utilize all kinds of resources wastefully. In other words, it is necessary to increase responsibility, which is possible only with expansion of the possibilities of displaying independence and initiative. It is in this direction that the country is now adjusting the economic mechanism.

In our association an example of self-control can be the system of responsibility and incentives for engineering and technical personnel in the sections for extracting shale. As distinct from the system adopted in the branch, the basis of the bonuses here is not the production indicators, but the economic indicators: profit, production costs and labor productivity (with unconditional fulfillment of the production indicators). When planning expenditures for the sections of all mines and pits we adopted a unified list of materials, articles of expenditures for production cost and wage fund. Thus the economic activity of the sections and shops were placed under

comparable and commensurable conditions, which made it possible to conduct a more correct evaluation of their activity. A system of sanctions was developed and is in effect for unsatisfactory utilization of material and financial resources. They were introduced: for immobilization of circulating capital for capital repair, for above-normative supplies of commodity and material values, for overexpenditure of the wage fund and for underfulfillment of the plan for recultivation (restoration) of land that was disturbed by mining work. The material incentive fund is reduced by the sum of the sanctions.

While in 1982 throughout the association all kinds of sanctions amounted to 66,600 rubles, in 1983 they amounted to 41,800. A more clear-cut orientation of the system of material incentives played a positive role in strengthening the economy. All this, of course, was based on legal norms, provisions, instructions and methodological recommendations which had to be developed from the start. These developments were honored by medals of the VDNKh. And now for the 36th quarter in a row the Estonian Association is being awarded the Challenge Red Banner of the branch. For many years it has been entered on the all-union honor roll.

Today the development of production capacities for extracting shales is outpacing the need. With a shortage of fuel resources, this is an extraordinary case and requires study since shale is not only fuel, but also raw material for chemical plants: from it they produce furnace fuel oil, epoxy resins, tanning materials, rubber modifiers, electrode coke, fuel precipitants, and so forth. But regardless of all this, overfulfillment of the plan is prohibited at the risk of a sanction. Under these conditions planning from what has been achieved looks especially absurd.

In order for the head economist not to become a two-faced Janus, it is necessary to accelerate the work for restructuring the economic mechanism and determine more clearly the role of the manager of the economic service in the management of the enterprise or association.

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CLARITY IN BOOKKEEPING URGED

Novosibirsk EKONOMIKA I ORGANIZATSIYA PROMYSHLENNOGO PROIZVODSTVA (EKO) in Russian No 11, Nov 84 pp 130-134

[Article by G. V. Yemuranov, candidate of economic sciences, head of the laboratory for improving bookkeeping accounts of the All-Union Scientific Research Institute of Economics of the Gas Industry (Moscow): "Bookkeeping Accounting: "Why Is the Mirror Growing Dim?"]

[Text] In the round-table discussion on problems of improving the work of economic services of the enterprises they justifiably expressed concern over the condition of bookkeeping services.¹ For bookkeeping accounting is one of the most important spheres of economic activity. It is the main source of information on the basis of which management decisions are made. Figuratively speaking, bookkeeping is a mirror which reflects the financial and economic activity of the enterprise (organization) and its results.

According to official figures, there are more than 2.2 million bookkeepers in the country. If one adds to this the warehouse workers and the engineering and technical personnel who fill out various accounting documents each day, the overall number of people employed in the sphere of accounting increases considerably.

Still, alarming symptoms have begun to appear ever more frequently and clearly in the accounting system recently: data concerning the composition, quality and time periods do not fully satisfy the needs of management: a considerable proportion of the production expenditures are included in the production cost indirectly. Because of how complicated it is to formulate information by hand there is a deliberate rejection of it to the detriment of the interests of management. The technical support for accounting lags behind the equipment of the basic production, the prestige of the profession of bookkeeper is dropping, the number of incompletely staffed bookkeeping offices is increasing, and in the newspapers one encounters more and more frequently the announcement: "Bookkeeper Needed."

For the personnel services of the enterprises and associations, and even for the ministries, the searches for head bookkeepers are becoming a problem that is difficult to solve. The country's VUZes and technicums annually graduate about 120,000 specialists in bookkeeping. At the same time the proportion of

bookkeepers with a higher and secondary education is considerably less than that of other categories of workers who hold management positions at the enterprise.

Let us try to figure out the reasons for the situation that has taken shape. In the opinion of some, the work of the bookkeeper is tedious, uninteresting and absolutely uncreative. Routine executive work under instructions and routine labor--this is how bookkeeping work was once characterized by academicians S. G. Strumilin and V. M. Glushkov. Rigid regulation of the accounting process reduces elements of creativity to a minimum. The bookkeeper's selection of a variant of a solution to any financial and economic problem, when he has experience, sufficient knowledge of instructions and methodological documents and the specific features of production, in the majority of cases, amounts to finding the appropriate article (point) of the instruction or provisions, that is, there can never be any more than one solution.

The labor of the bookkeeper is distinguished by increased disciplinary, material and criminal liability, which increases with his rank. The rank-and-file worker is responsible only for the results of the work in his section (if he has made a mistake, for example, when calculating wages--they take the overpayment out of his pocket).

The head bookkeeper, because of the extent of his duties, is physically not always capable of checking all calculations for wages and operations with monetary and material values, and he is forced to entrust his control functions to other associates in the bookkeeping office, Although he still retains all of the responsibility for this work.

There is never enough time for all of the bookkeeper's work. The time periods for drawing up and submitting reports and payments to the budget, the bank and the higher agencies make a certain imprint on the nature of the bookkeeper's labor. Many have probably had occasion to observe how on days before holidays when in the plant administration people are lively and running about and drinking tea, the bookkeeper is hard at work, without tearing himself away from his papers. This is explained simply: losses of the bookkeeper's time are reimbursed only by overtime work or work on Saturday or Sunday. In the majority of cases he even uses his vacation to make up for the overload during working time since during the time of his vacation things pile up and wait for his return.

Not many people think about how difficult it is, for example, within 3-4 days after the last tables and orders have been submitted to the bookkeeping office, to calculate without mistakes the earnings of 300 and more workers under conditions whereby the system of wages and bonuses is extremely complicated because of the numerous additional payments and increments.

The work of the bookkeeper requires executive conscientiousness, precision, punctuality and meticulousness. According to data from a questionnaire, a conscientious attitude toward work is recognized as the main quality a bookkeeper must have.

The level of requirements made on his professional competence is also extremely high. In addition to the methodology and technology of accounting, the bookkeeper must store in his mind the fundamentals of civil, labor, administrative and financial legislation, economics of the branch in which he works, and the principles and policy for planning, financing, norm setting, extending credit and analyzing the economic activity and the possibilities of modern computer equipment. The most complicated thing for the bookkeeper is to know the instructions and provisions, which, in addition to everything else, are constantly being changed and augmented.

Having this baggage of knowledge, any head bookkeeper can successfully be in charge of the work of financial or planning-economics divisions or the division for labor and wages, which frequently happens. But one does not find the reverse process....

Because of the nature of their work many bookkeepers communicate with a large range of people. It is necessary each day to give various reference figures, explanations and consultations. Work with people requires patience, restraint, tact and benevolence. It is even possible to refuse a worker's request in various ways: to cut him off bluntly or to calmly explain the reason for the rejection with a reference to the corresponding provisions in the law.

The working conditions for the head bookkeeper are influenced significantly by the nature of the interrelations with the top manager. It is good when they have complete mutual understanding here.

Work in the planning division and other economic services, as distinct from the bookkeeping office, is less labor-intensive and is not without elements of creativity. Therefore the bookkeepers who are graduates of technicums and VUZes, having worked the amount of time established for young specialists, frequently transfer to the planning and economics divisions. This again is explained by the circumstance that the earnings of the rank-and-file bookkeeper are the lowest among the salaries of the workers of the management staff.

Because of inexplicable considerations, increments to the official salary from the 0.3 percent of the planned wage fund cannot be established for head bookkeepers and they cannot be given additional payment for their scholarly degree, although these limitations do not apply to other workers of the management staff.

Since ancient times keeping accounts has been an exclusively male occupation. But during the war years and especially in the postwar years there began an intensive process of replacing men in the bookkeeping offices with representatives of the beautiful sex. Initially women were satisfied with the position of accountants, cashiers and rank-and-file bookkeepers, where their efficiency and conscientiousness were very useful. But now one more and more frequently encounters women who are in charge of accounting at an enterprise, in an association or even in a ministry.

Without belittling the business qualities of women who are head bookkeepers, it should still be noted that this position requires certain qualities of character that are more inherent in men, and also total self-sacrifice, which is extremely difficult for women because of their great involvement in the family.

The generation of bookkeepers who are now in charge of accounting at the higher levels of management (ministry and department) are close to pension age. They have made a certain contribution to the development and improvement of bookkeeping: in their time they have developed order journals and table-punch card forms of accounting, the operational book method of accounting for materials and the normative method of accounting for the expenditures on production, and so forth. But this is no longer enough. It is necessary to considerably expand the composition of accounting information and to increase its reliability and efficiency. It will be impossible to advance without raising the level of mechanization of accounting and computing work.

The capabilities of modern computer equipment make it possible to completely relieve bookkeepers of routine operations and to use the time that is released for economic analysis and strengthening of control functions.

Attempts to utilize computers in bookkeeping in our country have a history of more than 10 years. At the present time thousands of production organizations and scientific research institutes automatically develop information and program software for various accounting tasks, reproducing them repeatedly even within individual ministries and wasting no small amount of state funds on them. Dissertations are being written and defended on automation of accounting, and monographs are being published which contain "certain principles of the approach to solving problems related to automation of accounting"....

But with a closer examination it becomes clear that little has been done in practice. The main thing is that there is no tested methodological approach that provides for comprehensive, all-around performance of accounting tasks in their interrelation on computers with output for the balance and the report, and there is no methodological basis for a new form of bookkeeping which is oriented toward the computer.

One of the reasons for the inadequate level of accounting is the attitude toward it on the part of the managers of the bookkeeping services themselves (mainly of the ministries and departments). They have not been able (or have not wanted) to take over the leadership of the work for automating accounting and have farmed it out to people who are quite remote from the problem.

The question of improving bookkeeping on the basis of its mechanization and automation has outgrown departmental boundaries and has assumed great national economic significance. It cannot be resolved by the primitive methods of the enterprises and organizations, and must be resolved in the head interbranch and branch scientific research institutes on the basis of the utilization of the latest achievements in this area--both domestic and foreign.

And, finally, an extremely fundamental issue--incentives for bookkeepers. In our country any labor is respected. If a person works conscientiously and gives all of himself in his position, he has a right to count on having the society recognize his merits. We have many honorable bookkeepers who are selflessly devoted to their work, and have devoted their entire lives to this work. But one must really include in the category of exotic those rare cases in which the bookkeeper is awarded orders or medals. This attitude is not trivial either, and it does not contribute to the development of feeling of pride in one's occupation and it does not contribute to increasing its prestige.

The length of this article does not make it possible to touch on a whole number of issues that are now bothering the bookkeeper. But even from those problems which have been raised, it seems to me that one can draw certain conclusions. Incidentally, it would be better if they were drawn by those people on whom they depend so that the labor of the bookkeeper will become more creative, attractive and productive so that he will be encouraged for his merits. It should not be allowed for the bookkeeping profession to be entered into the Red Book....

It is important that the mirror of production reflect clearly and without distortion the multifaceted activity of the enterprise. No blank spots are allowed in this mirror.

FOOTNOTE

1. "Economists Must Actively Influence Production," EKO, No 11, 1983.

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MANAGEMENT LEARNED IN ECONOMIC SERVICES

Novosibirsk EKONOMIKA I ORGANIZATSIYA PROMYSHLENNOGO PROIZVODSTVA (EKO) in Russian No 11, Nov 84 pp 135-138

[Article by V. I. Minevich, deputy general director for economics of the Dneproshina Production Association (Dnepropetrovsk): "The Economic Services-- A School of Management"]

[Text] I share the viewpoint of the participants in the round-table discussion concerning the expansion of the sphere of influence of the economic service. This should take place as a result of strengthening analysis and prognostication and as a result of more in-depth economic reworking of programs for technical development. The June (1983) Plenum of the CPSU Central Committee set the task of forming a new kind of economic thinking. Our services should play an especially significant role in this work.

The block of economic services does not have the same degree of completeness as the technical and production services do. And the management of economic work is not concentrated at the upper levels of branch management, while the technical divisions, for example, efficiently coordinate their activity in the all-union industrial association with one individual, the head engineer, and in the ministry--with the technical administration.

It would be useful for the economic service to have a small group of highly skilled workers who would have only one task--"to think," that is, to analyze the possibilities of their production and the experience of others. The Gosplan and the Goskomtrud, the Ministry of Finance and the branch ministries have their own scientific research institutes. But at the enterprises--where the fate of increasing the effectiveness of production is decided--there are almost no conditions for concrete economic analysis.

The problem lies also in the immense moral damage and after it the economic damage caused by the annual reduction of management personnel and the division of the staff collective into AUP and not AUP--practically into workers of the first and second grade.

During the past 13 years the volume of production in our association has increased by 75 percent, the number of workers--by 44 percent, and the number of engineering and technical personnel and employees--by only 1.6 percent.

But the number of workers of the economic profile is decreasing. The number of economists for planning and labor is 83 percent of the number in 1970 and bookkeepers, finance workers and legal experts--97 percent. While the number of all engineering and technical personnel and employees amounts to 11.6 percent of the workers in the association, economists comprise 0.78 percent (in the past--1.27 percent). Previously for each one worker of these services there were 79 laborers, now there are 28. The association is expanding and the scale of production is increasing, but the number of economists, bookkeepers and norm-setters is not only not increasing, but is even decreasing.

At tire enterprises of the country the shops work on a schedule, 24 hours a day. And in these shops they have no timekeepers or dispatchers. And yet we know of enterprises which operate on two shifts with 2 days off--Saturday and Sunday--, where there are 1,500 workers, which have an organizer of competition, an associate for scientific organization of labor, an engineer for brigade forms of labor organization, a laboratory for economics and so forth. For all of our association we cannot assign a specialist who will engage only in brigade forms of labor organization, and only two individuals perform the functions of organizers of the competition. There is nobody to handle personal accounts of savings and normative methods of accounting. It has long been time for scientific research institutes of the Gosplan, Goskomtrud, and Ministry of Finance to develop and approve indicators for determining the number of engineering and technical personnel, including according to their functions; and they should abolish the division of the collective into AUP and not AUP.

Of course, along with this it is necessary to establish what the economic services should be doing today and to determine their organizational structure and the status of the deputy director of the enterprise (association) for economics. Everyone understands what a responsible position this is, but still there is not enough concern about increasing its prestige. The deputy director for economics should be a full-fledged manager: he should participate in the formation of expenditures on production and economic incentive funds and approve plans and calculations of the economic effect.

The composition of personnel depends on the legal status of the economic service, its organizational structure and the structure of organization and payment for labor. In my opinion, it is necessary to introduce in the branches the position of deputy minister for economics, and in the VPO's--deputy chief, with extensive rights.

During recent decades the economic services have become mainly female. The majority of students in economics institutes and economics departments are girls. It is understandable why men no longer choose the occupation of economist. It is much more interesting and prestigious to be a technologist or designer instead of an economist or bookkeeper. And the pay there is better. The economic services deal with the outside world and control agencies, and they are constantly in contact and--alas--sometimes in conflict with people, since in accounting, control and organization and payment for labor many interests converge. This work is stressful and involves many concerns, and there is no confidence in the future since the AUP workers are

permanent candidates for being eliminated. Improvement of the products by a designer or technologist can be celebrated with bonuses, incentives and awards, but work on the provisions concerning cost accounting, on the methods for determining the material incentive funds or the conditions for competition, or on improving the norms are not noticed by anyone and nobody says a kind word. So why should an energetic young chap become an economist?

All that has been said certainly does not mean that experience is not being accumulated and that economic methods of management are not being approved. This work is going on everywhere, including in our association. We have close contacts with the service of the head bookkeeper of the association as well as the engineering services. Through our own efforts we have developed provisions concerning in-house calculations (we have prepared the third edition), we are improving the methodology for determining the amounts of material incentives for the shops and provisions concerning bonuses for engineering and technical personnel and employees, and so forth.

In order to exercise control and mobilize resources in the shops, economic councils have been created. They are essentially schools of training in concrete economics, since once a month when the shop chief holds a meeting of the economic council everyone attends them--from the brigade leaders, party group organizers and trade union group organizers to the deputy chiefs of the shop and representatives of the functional services. Every meeting begins with information about the implementation of the decision of the economic council for the preceding period. Then they hear information from the shop economist about the work during the past months and reports from two or three lower-level managers.

Each month, under the chairmanship of the general director, a balance commission meeting is held at the association, and it is attended by the managers of all subdivisions. It proceeds approximately according to the same plan: not much is said about the positive results, and the reasons for unsatisfactory indicators are analyzed. From the results of the analysis a commission decision is prepared. When the decision is signed by the director, it acquires the force of an order.

For 15 years now a technical and economics conference has been held in the fourth quarter under the leadership of the association's party committee. It takes place first in the shifts, shops and subdivisions and it is culminated with a general meeting in the association. There are seven sections. The recommendations of the conference become the basis for many measures for the next year. Such a conference can be called a school of economics education. As one can see from all this, the role of the economists is increasing. It is only necessary to create conditions for their more active work.

In order to resolve issues concerning the structure and functions of the economic service it would be useful, under the leadership of the most

outstanding economics scientists, to gather together 20-30 deputy directors for economics and in a calm businesslike way discuss everything and draw up proposals.

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RESPONSE TO ARTICLE ON TECHNICAL CONTROL

Novosibirsk EKONOMIKA I ORGANIZATSIYA PROMYSHLENNOGO PROIZVODSTVA (EKO) in Russian No 11, Nov 84 pp 138-146

[Response from R. B. Radushkevich (Podolsk, Moscow Oblast) to the article by I. A. Rudokas, "Fewer Controllers--Better Quality," EKO, No 7, 1983: "Radical Measures Are Needed!"]

[Text] In his article I. A. Rudokas correctly points out the main shortcomings in the work of the OTK [Division of Technical Control]. Indeed, large losses from defective work in production, defective products going to the consumer, and conflicts in the collective are all things which we come up against every day. But as for the reasons for their appearance (poor organization of control; insufficient adherence to principles and poor work of the controllers, and their low qualifications as compared to those who are being controlled: workers--"surgeons," and controllers--"nurses"; the lack of technological substantiation [for control] of design decisions; the unfeasibility of technology intended for all-encompassing, complete control), these are the main things. Therefore there are doubts about the measures proposed by R. A. Rudokas: concentrating control at critical points, reducing the number of control operations by expanding worker self-control and mutual control, and reorganization of the OTK into a subdivision for product quality control.

How Is Quality Formed?

Let us ask a question: Who is most interested in quality? It seems that everyone would give the same answer--the consumers are most interested in quality (regardless of whether we are speaking of consumer goods or products for production and technical purposes). Since when developing ideas of reorganizing the OTK the author suggests assigning this service a major role in solving all problems related to quality, it will not be inappropriate to note that, in the first place, the level of quality is formed during planning and, in the second place, in the process of production (including its preparation for the output of new products) the quality that is invested in the design should be preserved.

Both things are important for the consumer. But the formation of the level of quality that was legitimized by the USSR Gosstandart envisioned a certain link

with the consumer only in the stage of coordinating the technical assignment (TZ) and in the period of interdepartmental testing (MVI) of the model that is created. And certain stages--planning and preliminary testing, when the quality is invested and it becomes clear what will be put out--take place without control on the part of the consumer. Nor can the work in the MVK (interdepartmental commission) satisfy this requirement in the majority of cases: those members of the MVK who represent and defend the interests of the producing branch have considerably greater possibilities. Another part of the members manage, as a rule, only to become familiar with the protocol of the preliminary tests (where, of course, everything is "roses") and view the demonstration of the model. The preparedness of production for series output is verified at best from documents which are submitted by the enterprise. As a rule, there is no examination of the model after testing in the presence of the MVK.

Unfortunately, there are branches in which it is impossible to determine whether or not the new product corresponds to the best domestic (there are no analogues) and foreign (there is no information) models. The developer himself determines what should be selected from foreign catalogues. Sometimes there is nothing to select from these catalogues except for the weight and size. Nonetheless, "without a moment's hesitation" it is decided whether or not the product corresponds to the best domestic and foreign models. The chart of the technical level and quality of products (KU) with these conclusions passes unimpeded and without proof through all the approval and registration agencies.

Frequently an unperfected model is released from mass production even before the document is approved by the MVK. This was written about, for example, by the press operator from the Chelyabinsk Production Association, Ye. Demicheva in her letter entitled "Anonymous Poor Workmen."¹ But more frequently one encounters the other extreme in which the item has long passed through the MVI, but has not been put into series production because of the poor technical equipment of production, its lack of preparation, the lack of funds for materials and batching items, and so forth.

The OTK does not participate in the process of forming the level of quality. There is no competitiveness, nor is there any control. Therefore one should not be surprised that the consumer too often receives something that is far from what he has ordered, and sometimes this is not the thing that was tested in the presence of his representatives at the MVI.

Academician V. Trapeznikov in his article entitled "Administration and Scientific and Technical Progress,"² writes: "The situation has become more complicated since the producer is essentially not responsible for the performance of his product in operation."

The decree of the CPSU Central Committee and the USSR Council of Ministers, "On Measures for Accelerating Scientific and Technical Progress in the National Economy" (August 1983) creates possibilities for radical improvement of the quality of the products that are produced. Reorganization of the technical control service would be a logical addition to the measures envisioned by this decree and one of the most effective levers for their rapid

and unwavering introduction. But this will depend on how radical the reorganization is.

Maintaining the Quality Level

"What does the manager of an enterprise do," writes Academician V. Trapeznikov in the article mentioned above, "when he encounters difficulties in fulfilling the plan? He selects a variant which is the least unpleasant to the enterprise and, most likely, this will be the output of a large quantity of items at the expense of their quality."

If one looks at the numerous announcements of changes in the design and technological documentation, the technological decisions, and the work notes goes through the numerous entries in the journals of the authors' supervision, it becomes clear that there is a tendency toward deterioration of the quality. In the aforementioned letter, "Anonymous Poor Workmen," Ye. Demicheva writes that during the past 3 years the return of footwear in the association as a whole has increased 1.7-fold, and 73 percent of the products that are returned have inadmissible production defects.

At many enterprises they prefer to speak about quality only from the podium. They hold "days of quality" (which should be called minutes or hours of quality) rarely and irregularly, and little is resolved then. From the consumer they wring out (sometimes under the threat of stopping deliveries) permission to deliver products without conducting the decisive kinds of final control, to send them in partial batches, and so forth and so on. Then there appear those shortcomings in the work of the OTK which were discussed by I. A. Rudokas. But the fight for quality does not end with this. I. A. Rudokas writes that a base has been prepared for radical reforms in the area of technical control during past decades: a system of defect-free labor has been created (85-95 percent of the products are released at the first presentation) and there is a comprehensive system of product quality control (KS UKP). But what is this base?

The Condition of the "Base," Quality Control

There is no doubt that we have enterprises where such a base has been created, and this has been achieved in various ways. The Masis Footwear Association, the Kaluga Turbine Plant, the Tiraspol Sewing Factory and a number of others. But more frequently one encounters something else: under the influence of fashion and pressure from above only the beginnings of such a base have been created, and in some places it has not been created at all. A division chief of the Chuvash Laboratory for State Supervision of Standards and Measurement Equipment, G. Shumilov, in an article entitled "Reserves for Quality Control,"³ gives a number of examples of a negative attitude on the part of certain managers toward KS UKP. Summarizing, he writes: "The system in the form of the standards of the enterprises exists of its own accord, and production develops of its own accord." Alas, this is a correct description of the majority of KS UKP's! This is the way it is. The standards and the tiny bureaus (divisions) have no link with production and no real power. But this nonetheless gives enterprises the right to register the KS UKP in the USSR Gosstandart and to report to superiors.

Curious conclusions were drawn by Western specialists on the basis of an analysis of the economic aspects of the activity of machine-building companies:⁴ in each production there is a "hidden plant" for eliminating the defects that have appeared, which takes from 15 to 40 percent of the capacities of the enterprise as a whole; the solution to the problem of quality at four-fifths of them depends on the managers of the highest level and on their ability to solve this problem.

We have figures from such an analysis in domestic machine building, but at enterprises where the top manager does not deal completely with quality there is no quality control, but there is a "hidden plant."

The Condition of the "Base." What Is Concealed Behind the Figures?

Acceptance of 85-95 percent of the products with the first presentation! In one case the tender-hearted OTK workers (possibly in the name of maintaining a healthy microclimate in the collective) feel sorry for the "surgeon"--the performer of the work. This is if the defect can be eliminated (it can be brought up to the necessary size, a gouge can be filled in, ragged edges can be filed down and so forth). But if the defect cannot be eliminated or its elimination is "economically inexpedient," a chart of permission for deviations will be brought up (KR).

The KR--this list which is not prescribed by any document and is not legitimized, an industrial way of saying "there's still hope"--is the simplest, easiest and most widespread method of covering hack work, disorganization, unsatisfactory technical condition of equipment, the lack of preventive inspections and repairs of equipment, and irresponsible officials. At an enterprise with 3,000-4,000 workers, an average of 2,000-2,500 of these charts are drawn up in a year.

The KR is a clever trap. There is a defect but it seems that there is not one, and it is permitted by the head designer and the chief of the OTK, and it is approved by the head engineer or his deputy. Sometimes it is called a chart of coordination or a chart of deviations (it varies in various branches). Thus the main thing is achieved--a part is "passed" and the worker has released this part with the first presentation (the percentage has been saved!).

Nonetheless it might seem that the worker would be severely punished. "No pay for the work," "50 percent pay for the work," outlined in the KR. But let us not rush to conclusions. This is still nothing but an ordinary "forgery," a game among adults in which everyone pretends that he does not know what is known by everybody. And in fact nobody would even think about withholding either 50 percent or 100 percent from the person guilty of the defective work.

Recently at one of the plants near Moscow it was necessary to manufacture eight items. The category of their difficulty was IV, that is, the lowest in the classification that was being used. During the process of their manufacture they filled out 25 charts and two technical decisions whereby they "passed" 103 defects. We shall not discuss the reasons for the defects,

which were indicated in the KR. At best they were in the area of unscientific fantasy. Smoothing the cast pieces and final cleaning, including fitting dimensions, are all carried out on the same machine tools; not one of these machine tools is ever checked for technological precision; all of the workers who produce defective work except for one have a category that is lower than the category of the work that is performed; of the 11 workers who were named in the charts concerning the resolution for withholding wages, only one brigade leader actually suffers and he was deprived of his quarterly bonus for his personal stamp.

I shall refer once again to the correspondence of Ye. Demicheva, "Anonymous Poor Workmen." She considers one of the reasons for the defects to be the inadequate demands made on the people for the part of the work entrusted them, having in mind both workers and managers of various ranks. "The lack of control and the all-permissiveness...in a word, it is heaven for the poor workmen," writes Ye. Demicheva. Among other reasons she gives the lack of careful study and analysis of the concrete reasons for the defective work and the anonymity of the poor workmen.

Questions arise automatically. Why work well if nothing happens when you work poorly? Why increase qualifications if your earnings are good with low qualifications? Why be concerned about quality when all they do is talk about it? In general why reveal defects if they are "past" on the KR? What is concealed behind the figures 85-95 percent release of products with the first presentation?

Main Reasons for Shortcomings in the Work of the OTK

What demoralizes OTK workers is the constant pressure on them from production leaders of all ranks, which is directed toward reducing the requirements for product quality; the extensive issuance of KR's for defective products, technical decisions and entries in journals of authors' supervision, constantly adjustments to design and technological documentation which reduced the initially established requirements; and the impunity with which poor workmen operate.

In the standard provisions concerning the OTK we will not find among the duties of this service the little-known appeal to negligent managers concerning "prevention of defective work" through the efforts of the OTK. This is quite understandable for prevention should be the business of those who have the means and forces for this work. The standard provisions concerning the OTK envision the participation of this service only in the development of measures for preventing defective work and checking for their fulfillment and effectiveness.

A good example of a correct attitude toward the OTK and radical solutions for controlling product quality is provided by the work of the Masis Footwear Association.⁵ Here is what its general director, G. Kh. Arutyunyan, writes: "When creating the quality control service we discussed the subdivision on the basis of which it should be formed. The variant with the technical control division (OTK) was immediately rejected. The OTK is a state service which determines the destiny of already prepared products.... And quality should be

controlled at all stages of the production process on the basis of a subdivision which is linked to all of this process. Therefore we decided to create the division for control of product quality on the basis of the production preparation services under the leadership of the deputy director for production."

An excellent and, unfortunately, rare example of vision of the essence of the problem by the top manager!

The only correct line toward improving quality control is to make it stricter everywhere, beginning with the stage of the technical assignment and preparation of production for the output of the new products right down to packaging, dispatching and transporting the products to the consumers. Here we are not at all denying the expediency of concentrating control in "critical points." The question is in whose hands to place the control, what the control should encompass and what authority should the reorganized service have?

What Kind of Reorganization Is Needed?

The answer suggests itself. If the managers are more concerned about the fulfillment of the plan and less concerned about the quality of the products that are produced and the interests of the consumers, if the influence of the consumers on the producers is extremely inadequate and between the consumer and producer there is an intermediate unit, the OTK, which poorly defends the interests of the consumers because of its limited rights and its dependence on the producers, this means that it is necessary to place the producer (in questions of product quality) in a position of being decisively dependent on the consumer.

To representatives of industry this idea would apparently seem extremely seditious. Alas, they are making an attempt on the holy of holies--on the right to self-evaluation. But, after all, this is all nonsense! A student or a schoolchild does not evaluate himself!

The proposed reorganization corresponds to the greatest degree to the socialist planned system of the national economy and to the unity of public interests. The system of organization of technical control on the part of the consuming branches has long been known, since the time of Peter the First--with the representatives of military departments. Moreover, this system has been borrowed by a number of other departments and branches with more or less success, depending on the internal organization and the authorities. The idea of taking the technical control system out of the jurisdiction of the production branches is literally in the air.

Some people suggest making technical control in general an independent organization, for example, placing it under the jurisdiction of the USSR Gosstandart.⁶ But such a solution does not bring the producer closer to the interests of the consumer. We do not need independence of control, but its transfer to the hands of those who are most in need of quality.

What would such a reorganization mean? Every enterprise has a client who consumes a larger proportion of the products that are produced than other clients do. Control over all of the products produced by the given enterprise should be placed in his hands. If the enterprise produces only consumer goods, control should be transferred to the hands of the inspection team under the jurisdiction of the USSR Ministry of Trade. The qualification of the workers of the inspection team should, of course, be higher than those of the controllers of the OTK, and one cannot agree with I. A. Rudokas here. And the staff of each body of representatives should include specialists of various profiles who are capable of figuring out all of the technologies that are used at the enterprise. The total number of personnel on all inspection teams could quite justifiably be taken as equal to half of the number of personnel in all of the existing OTK's. Thus one would solve the material aspect of reorganization, which should provide for enlisting skilled personnel for the inspection teams. Taking into account control only of "critical points," the total number of staff on the inspection team should apparently amount to less than one-fourth of the number of personnel of the OTK. Social and domestic problems can be resolved using the principles of shared participation. It would be expedient to form the inspection teams with a simultaneous reduction of the OTK's in stages. This would provide for a succession of functions, the accumulation of experience and the determination of the optimal number of personnel on the inspection teams.

The authority of each body of representatives should be fairly broad. This body should determine the program and the volume of control and certify the perfection of the manufacture of the product, thus giving the enterprise the right to sell it, and also write out a document that certifies the product quality. The responsibility for product quality should be divided between the enterprise and the representative of the inspection team according to the nature of the shortcomings that are revealed during operation.

The representative body of the inspection team should have the right to decisive control over the technical documentation, changes that are made in it, observance of the requirements of the technological documents, the preparedness of production for the output of new and modernized products and other aspects of the activity of the enterprise that influence product quality.

In addition to the bodies of representatives at the enterprises, by the same principles it is necessary to create groups for observation under scientific research institutes and designs bureaus, giving them control over the planning and utilization of progressive technical ideas and the achievements of science, the observance of requirements of normative documents, and also the development of programs for preliminary receiving and periodic tests in cooperation with the developers and manufacturers.

With the proposed reorganization the worker will inevitably develop self-control and mutual control at the enterprises. This corresponds to the development of brigade forms of labor organization and wages which earmark increasing the role of foremen and requirements of increasing the responsibility of the executives for the work that is done.

But there should also be personal responsibility, and each worker who carries out a transfer or an operation should be known. And the stamp of the worker should not be a brigade stamp, as I. A. Rudokas suggests, but an individual stamp.

FOOTNOTES

1. SOTSIALISTICHESKAYA INDUSTRIYA, 17 August 1983.
2. PRAVDA, 7 May 1982.
3. SOTSIALISTICHESKAYA INDUSTRIYA, 25 April 1982.
4. VNESHNYAYA TORGOVLYA, No 7, 1983, p 24.
5. EKO, No 7, 1983.
6. Nikitina, A., "Hourly Qualities," PRAVDA, 12 September 1981.

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RESPONSIBILITIES OF OTK EXAMINED

Novosibirsk EKONOMIKA I ORGANIZATSIYA PROMYSHLENNOGO PROIZVODSTVA (EKO) in Russian No 11, Nov 84 pp 147-148

[Article by D. V. Klets (Rachin, Rovno Oblast): "To God What Is God's, But the OTK?"]

[Text] The quality of labor depends on a whole number of factors.

How much does the OTK have to do with them? Is this its concern? Of course not! Then why expect from the OTK radical improvement in the quality of labor in the country? Or even make complaints against the OTK regarding this?

Let us look at the think realistically. In the ideal (and one must strive for this) each worker and each service must perform its work precisely and be responsible for it. But what does the OTK do, and what does it produce? Information The product of the OTK is generally information about the consumer value of the results of the labor of the enterprise. For OTK workers do not stand at machine tools, at blast furnaces, behind the wheel and so forth. How can they take responsibility for another's work? Or force the workers to do their work well? Therefore it is hardly correct to blame the OTK for defective work.

The OTK must deliver information about what to produce and of what quality, strictly objective information. But quality is also required of the OTK. And the OTK must provide it...on the corresponding blank forms. So we have--defective work and also distorted information.

In order to provide objective and prompt information about the quality of labor it is necessary to eliminate departmental interests which bring about distortion of information and strictly determine the area of their activity. And that is all! In no case should they be in charge of material values that are on the accounts of other people (services).

And the production parameters that are controlled within the enterprise can be distributed among the services of the head metrologist--current parameters, and the head technologist--critical points (in keeping with I. Rudokas) or in general they can be under the quality control service.

Such a reorganization will not increase the size of the staff. Rather on the contrary.

And, as I. Rudokas correctly writes, it is extremely necessary to improve the material base of the OTK. But this is our common problem--wherever it is necessary to have an objective accounting of something we never have the necessary means of measurement, analyzing, monitoring and so forth. Or else they are outdated.

And so we should not require of the OTK that which it does not do, that is, quality of labor, but only information about quality which is prompt and precise. Otherwise we will end up without information and without quality.

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SUPPLY OF FRUITS AND VEGETABLES FOR CITY DWELLERS

Novosibirsk EKONOMIKA I ORGANIZATSIYA PROMYSHLENNOGO PROIZVODSTVA (EKO) in Russian No 11, Nov 84 pp 150-165

[Article by Nikolay Tereshko, journalist (Chelyabinsk): "In Season and Between Seasons"]

[Text] The diversity of ways of solving the food problem. Many industrial enterprises, even those that are not included in the agroindustrial complex invest considerable means and efforts, creating their own subsidiary farms and helping agricultural enterprises. On the whole ties between industry and agriculture are now fairly extensive, but perhaps the weakest link is still the sale of agricultural products (procurement, processing, storage and sale). Losses because of the imperfect organization and poor technical support for procurement and trade enterprises are fairly large.

The city market reacts rapidly to various interruptions in state and cooperative trade. The experience of Kurgan and other cities shows that these interruptions will be less frequent only when industrial methods are applied in the stage of the sale of agricultural products. Well, to provide modern technical equipment for the final operations with agricultural products--both at food enterprises and in the stores, dining rooms and personal kitchens--is the duty of many industrial branches.

In the remarks published below we discuss certain problems in selling agricultural products--vegetables and fruits. The editorial staff hopes that these problems will attract the attention of managers of industrial enterprises, without whose assistance these problems cannot be solved.

I have seen many bazaars. Southern and Siberian, Baltic and Moscow--they are quite different from one another. But they have something in common, which is poignantly expressed by a folk saying: "At a bazaar there are two fools: one asks too much, and the other does not give enough"...

What Do Tomatoes Cost?

With the kind assistance of the director of a hotel near the market I convened in his office something like a round-table discussion. Participating were 10 of "our guests," as they are called in the hotel, from the Caucasus and Central Asia. I did not ask their names so that the people with whom I was conversing would be more open. These were people of various ages and, as one could feel from the conversation, of various life experience and education. They brought watermelons from Fergana, apricots from Dagestan, onions from Sukhandarya, and tomatoes from Andizhan. There were tons of everything and for everything there were certificates that these were the crops from their farmstead plots. Forget about the certificates. I, the consumer, am interested in why onions cost a ruble, watermelons--2, tomatoes--3 and apricots--4? And this is in the autumn!

"Is this not too much, my friends?" I asked.

"No, it is not expensive. You do not believe me, let us calculate," answered an elderly Uzbek from the steppes.

His hands were grimy with dirt and machine oil, and his clothing was more than modest. One felt that this was not a masquerade, but his daily attire. He had brought 5 tons of tomatoes, or, rather, had left home with this many. During a week of travel from Andizhan to Chelyabinsk half of these tomatoes had fallen out along the dusty Asian roads. Some of them had become spoiled here while they were being sold. But even in this case, according to the farmer's calculations, he would earn no less than 6,000 rubles.

"This is still a ruble per kilogram," I said.

"Do not be hasty, my friend," the Uzbek defended himself. "What about shipment? Three thousand per vehicle."

"How much?!"

"Three thousand," repeated the Uzbek. The rest of them nodded in agreement: words of truth.

Then I checked this repeatedly and everything was correct. Such was the tax with small variations for delivery of the cargo from Uzbekistan to the Urals.

"Well, all right." I sat down. "There remain 3,000. This means 60 kopecks per kilo. That is still expensive. Probably at home they cost one-half to one-third this much."

"You are right," affirmed the Uzbek. "From 30 to 18 kopecks. But I am not left with 60 here, but barely 40. There are expenses here, expenses there. I have been trading for a week, I am living in a hotel, and I am eating in a dining room."

"He lives very modestly," inserts the director of the hotel.

"And the expenditures 'there,' what are they?" I was interested.

"The vehicle travels for a long time. Many people delay it, and the goods spoil--we give them some.... You understand...."

"And if tomorrow the extortion increases, will you give in?"

"We shall give in, and charge more."

"From me, the consumer? This means that I have to pay for all of your expenses? But why? Why must I compensate for all of your losses and expenditures?"

"But why do we not sell the products locally at 30 kopecks? Why do your procurement workers not bring the fruits and vegetables here, those which are now spoiling and rotting? If they need an extra washer they send an aircraft after it. But do they not need fruits and vegetables for the plant dining room? And why should my labor not be paid for?" The Uzbek is taking the offensive now.

The old men in their small embroidered skullcaps nod their heads in agreement, and the young Dagestani stands up for himself:

"They did not take my garlic until the end of July. Then they gave me 90 kopecks, but it had dried out and become light. It was a loss for me and for you also--will you buy garbage at a ruble and a half?!"

And he talked heatedly for a long time about how his entire family works in the farmstead plot. It must be recognized that they work harder and better than they do on the sovkhos. But then there is the return. The sovkhos pays 1,000 rubles a year for work which brings 3,000 to the farmstead plot. I think that he reduced this figure. He himself said that the garlic produces a thousand rubles and that they harvest 2 tons of fruits--early cherries and apricots. This sold at more than a ruble per kilogram. Although he does have expenditures too...."

"Well, let us say," I began to get involved, "that we forget about the spoilage of the cargo en route, everything is clear there. We shall not talk about delays or extortion either. This is a matter of chance and luck. But what about the cost of transportation? Does the state really charge this much for utilizing the trucks?"

"The state charges most of all--half," answered the person with whom I was speaking. And the specialists to whom I turned subsequently for consultation confirmed this.

"And the other half goes for the theft by the 'dogs' who work in transportation. Have you tried to protest?" I asked.

Their shoulders shook in a silent laugh. The young Dagestani shook his head, slapping his cap on his knee.

"Well, all right," I gave in again. "Did you at least try to pay for the cost of the shipment through the office of the automotive transportation at a price and receive a receipt?"

"You do not obtain a vehicle that way. All of them are engaged in shipping important national economic cargoes."

"Well, how do you hire transportation?"

"On the street...."

"Around the corner from the automotive transportation agency...."

"Eye to eye with the driver...."

"Money from one hand to the other...."

The conversation ended with this. But I did not give in finally and went to the OBKhSS. To my direct and precise question of whether or not the police knew about the extortion and how about the battle against this evil was proceeding they answered that they knew about it and that the battle was being waged, by other agencies as well.

And they made it clear that it is not a simple matter to expose a violator if one uses only administrative methods. There must also be an economic struggle, and it is necessary to counteract the market, above all the city fruit and vegetable trade network. It has several of the largest bases in the oblast, dozens of specialized stores and a circulation of many millions. Its situation creates the market conditions directly. And this situation is not generated when the bins are empty between seasons, but, paradoxical as it may be, in the winter when the storehouses are overloaded with a surplus of products in them.

The Kurgan Phenomenon

People come here from all corners of the country to study, exchange and disseminate experience. I too was in Kurgan and became acquainted with A. G. Safonov. He has been the director of the city fruit and vegetable trade network for more than 15 years. During this time hundreds of machines and mechanisms have been installed in the trade network and the capacity of the vegetable storage facilities has more than doubled, in spite of the fact that many of them have had to be removed because of their extreme dilapidation. The level of mechanization of the receipt, unloading and storage of fruit and vegetable products is close to 100 percent. Here there are no "mobilized taxes" from the enterprises either in the winter, the summer or in the autumn--the "tax" is taken from the city in form of live labor! Losses of products are evaluated at less than a thousand rubles; for the Chelyabinsk workers they are 250,000 rubles at best. There are also losses amounting to millions per year.

A good deal more can be said about the Kurgan phenomenon. About the two-story storehouses; about the storage of products, mainly potatoes, in bulk, which is extremely tempting economically, but equally difficult technologically--the day is saved by the excellent equipment of the bins and the advanced art of the base workers who are trained in this by Safonov himself.

In conjunction with the Siberian division of VASKhNIL, at the Kurgan fruit and vegetable base that autumn they completed the construction of a unique object. At the beginning of the century the Russian scientist F. V. Tserevitonov suggested an original method of storing fruits and vegetables in a gas environment. First it was necessary to treat the premises and the fruits with ozone, and it would kill all the harmful microorganisms whose life activity leads to spoilage of the products. Then the premises were to be filled with a mixture of oxygen, nitrogen and carbon dioxide with an absolute prevalence of the latter two. In this environment all biological processes come to a halt and the products remain in their initial form. The necessary gas composition in the environment is created in hermetically sealed chambers with the help of special generators. Research in the area of storing the crop under such conditions has been conducted by the most varied scientific research institutes of the country. Their activity is coordinated by the USSR State Committee for Science and Technology.

The effectiveness of the method has been scientifically substantiated. Its biochemical and physiological fundamentals have been studied and the optimal parameters for storing many fruits have been determined. And this is not a simple matter. Each degree, depending on the kind of fruit, is of immense significance. One kind should have a temperature close to zero while for another even approaching zero temperature would be a reason for damage. Apples turn brown and become inedible. When storage temperatures become too high there is another problem: rapid overripening.

In a word, it is not easy to realize S. V. Tserevitonov's method, but it is extremely tempting. It is gratifying that technology has been developed for applying this method, successful architectural and planning solutions have been found for the refrigerated chambers, and various methods of sealing the chambers have been tested. Standard plans have been approved for the storehouses with a regulated gas environment. Various kinds of equipment necessary for creating and maintaining the corresponding gas composition and conditions have been designed and tested. But nonetheless the storage of fruits and vegetables by the new technology is not being done on an industrial scale.

"Along with the compressor station which produces the necessary quantity of cold air for us, the ozone station creates the final "health service" for the garden and orchard products," said Safonov.

And I will add that this same compressor station has a 70 percent reserve of capacity "for growth" for the future, when the Kurgan vegetable trade network will increase the capacity of its present storage facilities. Safonov looks forward to a dispatcher point, calculating machines, immediate information supply regarding any question of the state of affairs in the trade network....

I will not say that the retail prices for vegetables and potatoes in Kurgan are very low. But still they are the lowest in the Ural area. And the vegetable stores are the richest. There is a direct dependency here: the stores compete successfully with the market.

A simple calculation: How many garden products are provided for us by the market and how many of them perish on the public fields and in the storage facilities? Approximately the same quantities. If we were able to preserve our harvest, the market would not ask so much of us.

What Can the Market Administration Do and What Can It Not Do?

Conscience is a moral category and its limits are not subject to regulation. The market knows the market conditions. And it is not subject to regulation either. But one can and should influence the market conditions. Including through the forces of the market itself as a trade enterprise.

But the Chelyabinsk Oblispolkom has set the goal of making the market actually a kolkhoz market. There are more than 200 farms in the oblast. Even if only half of them shipped some of their products to the market once or twice a year the matter would improve. The more resolute members of the ispolkom have even suggested establishing a strict weekly schedule of kolkhoz-sovkhoz trade at the market and determining a list of products and the price. But this suggestion was rejected en route by the managers of the oblast agricultural administration: what is sold at the market is not included in the state plan for the sale of products. And, as a rule, we have nothing in excess of the plan. The debates at the meeting of the oblispolkom ended here.

I have heard that in Krasnodar Kray the kolkhozes trade at the markets. I have visited there and seen the trade agreements which market representatives regularly conclude with the farms. And both parties are willing to sign them for they know in advance that nothing will come of them. The agreements are concluded for only one reason--so as not to lose time on meaningless negotiations and to give the appearance of mutual interest in the matter. The kolkhoz chairman knows that his agreement does not bind him to anything. The representative of the market understands this just as well. But both gain from one another and they part satisfied: it has been signed and it is over and done with. But what if the market itself were to purchase food products from the farms and were to trade them in the city....

"The market cannot do that for it is not a state procurement organization. It can trade, but it cannot purchase."

"Excuse me, but what is it supposed to trade then?"

"Its services, and that is all. And this is a form of services--market business, the business of its workers, and their creative attitude toward their creative attitude toward their responsibilities and tasks."

But first the question: Can the market administration fight against speculators openly? Yes, it can if it receives permission to demand documents from the person who is shipping the goods to the market for sale.

Then could it counteract speculation, if only by those who purchase surplus products from private farms, while the seller will be encouraged not only by the receiving price, but also by the possibility of "better money available"? It would seem--yes. It not only can, but it must. This is precisely why trade service bureaus exist at the markets. These are intermediaries between the traders and the purchasers. Such a system of service is advantageous both to the farmer and to the city dweller and to the market itself. The rural resident gains an advantage here in that he does not spend time on selling products, the market does this for itself, and in exchange he receives a commission. City dwellers save a little money too: the bureau sets prices at 15-20 percent below the market prices and thus brings them down somewhat.

This system promised a great deal, but did not come through with anything. The majority of the suppliers would agree to take advantage of the bureau's services if they could immediately receive in cash even half of the money they had coming to them. But the trade services bureau does not have money to give to its contracting agents ahead of time or even to advance to them. The financial capabilities of the bureaus enable them to purchase only small batches of inexpensive products: sunflower seeds, dried fruits, nuts. The bank refuses to give the markets credit for purchasing agricultural products because the market is not a purchasing or procurement organization.

On the one hand it is given responsibility, and on the other it is prohibited from meeting this responsibility. Therefore if you ship to the market a large batch of products and release them to the trade services bureau you will have to wait until your products are sold. Then they will take commissions from you. You lose time and one-fourth of your possible earnings. And you are given the money depending on chance--the market administration cannot offer you anything.

There are 27 markets in Chelyabinsk Oblast. Their annual commodity turnover runs into the millions of rubles. A number of bazaars have a complex of conveniences for trade: warehouses, refrigerated chambers and the necessary equipment. Others, and this is the majority of them, not only do not have refrigeration capacities and warehouses, but they do not have covered pavilions or a sufficient quantity of weights and measures. There is only one market hotel in the entire oblast. And there is not a single dining room or cafe. The markets do not have the capability of engaging in counter trade or encouraging the more active of their contracting agents. They do not have automotive transportation for shipping the products they have purchased from the farms. And they do not even engage in purchasing per se: in the oblast there is not a single nonstaff procurement agent who works under a contract with the market administration. Moreover, the market refuses to have anything to do even with what is offered to it by city gardeners.

The society of amateur gardeners in Chelyabinsk Oblast joins together 150,000 families who have at their disposal about 10,000 hectares planted in orchards and gardens. During a year with average productivity they receive 50,000-55,000 tons of fruits alone. Some of them, and this is a considerable part, could go for sale or for processing through the market bureau of trade services or the city cooperative trade network. But this does not happen.

The gardeners, having found no understanding or interest from the procurement workers, sometimes plow their apples into the ground if they cannot compete with the market or state salesmen.

And this circumstance is a real advantage to those who are called "Barygs." It is possible to purchase any batch of goods either at home or right at the gates of the market and then sell them at inflated prices. People can do that, and they do it successfully, but not in that way: as soon as a commodity for which there is a high demand (apples, citrus fruits) or an ordinary vegetable but one with excellent taste and appearance (cabbages and potatoes) appear in the vegetable stores they purchase them, again in considerable quantities, clearing out the store, and offer them to us from the market counter. Sometimes they are assisted by dishonorable store salesmen. In this case a lemon will increase in price five-fold, fresh cabbage--four-fold, and sauerkraut--even ten-fold. The market "dog" does not worry about appetite. And why not eat us up if we will pay as much as they want without complaint? Possibly we should revise this point of the "Standard Rules for Trade on the Kolkhoz Market" which prohibits the market administration from taking an interest in "where the goods come from."

The market has another possibility of dealing a blow against speculation even today: offering more services to the purchaser.

I have in mind home delivery, especially during the procurement season. Many people, and above all pensioners, in the autumn purchased two or three sacks of potatoes, and a sack or two of cabbage and carrots. At that time the vegetables are cheaper and the quality is better. But how do they get all of this home? The market cannot help because not only does it have specialized small cars for this, but it does not have any other kind of transportation either.

To be sure, this is yet another unsolved problem. And far from all city dwellers have a cellar. In certain cities of the Ural and Volga areas this problem is solved simply--they construct cooperative cellars right near the residential buildings. Frequently these are ordinary underground bunkers. They are made very simply: along the building they dig a trench which they build up and cover with reinforced concrete slabs, and they place sod on top so that the yard will not lose its attractive appearance. The construction is simple, but it is very necessary: any kind of a basement is a great help to a city dweller. But more frequently the local architects are unwilling to take advantage of this solution to the problem. And so the city dwellers have to take their grocery bag to the market on their days off. And in the winter, especially during bad weather, if there is anyone there it is only the bazaar "dog."

In the fight against speculation the staff of market workers are still powerless. They are also still powerless in carrying out one of their most important duties: influencing the price in the direction of reducing it.

And so it turns out that the circle is closed?! The market is a self-controlling force which stands outside public influence?! Nothing of the

kind. Without denying market interrelations, it is necessary to improve them. And not through orders, but through a competitive economic struggle.

Between Field and Store

The Ural area does not consume vegetables according to the scientific norm: instead of 150 kilograms a year, they barely consume 70. Ural residents are traditionally not accustomed to green vegetables. For them the "best vegetable" is a Russian ravioli. I recall when I was traveling with my family from the Moscow area to Chelyabinsk and took up residence with some childless elderly people. On Sundays the mistress of the house would stir the ravioli stuffing in a basin like the one in which my wife and I used to bathe our son. And she taught us: "Forget about your salads, this is a severe climate--not all kinds of food are acceptable"....

The "climate," as they say, is "severe." But the doctors never tire of repeating: more vegetables and fruits, knowing that the counters of the vegetable stores in the Ural area do not look rich, and that at the counters of the markets the prices are not within everyone's means. But the managers of the local vegetable branch think that things are not all that bad.

What can be seen at the best trade base in Chelyabinsk? There is not very much sauerkraut there, there are no fresh vegetables at all, there are plenty of pickles and tomatoes, but they do not taste very good. Let us just take cucumbers. The seed growers mixed the seeds and various strains grew up in the rows. Some could be pickled while others must be put on the table immediately. But the vegetable growers harvested them all together, and there was nobody to sort the cucumbers in the storehouse, and the autumn was unusually warm. So it was necessary to put more salt in the vats so that the mixture would not ferment.

"What good is a base here?" they asked me. "What the sovkhoses have provided has been prepared for winter. It would be better for you to look and see what they are doing in the stores--they are pickling the cucumbers not in brine, but in water and all of our labor has come to nothing."

In the stores they proved that the base was to blame: what it has given us is what we trade in. But we never did find out who had poured the water on the cucumbers and had been too lazy to prepare the brine. And how does one clarify anything if the entire conversation reduces to the fact: there are cucumbers available--crisp, fresh and cheap. What else do we need? We need for them to be tasty like the ones an old woman will give to guests.

"But the standard, incidentally, is not determined by taste," they vigorously defend themselves both at the base and in the stores. "For it the main thing is the external appearance and the size."

"There will be quality only when there is a standard for the field, a standard for the production technology of vegetables," I hear another objection and I must accept it.

The standard for a vegetable plantation means standard cultivation of the soil, standard seeds, standard planting of the crop, precise doses of water and fertilizer depending on the weather, and the desire to obtain standard fruit. Tomatoes, for example, should have firm skins and be drop-shaped. The cabbage should be all the same size, the heads should be a certain distance from one another, and they should be at a certain height from the ground. And in industry one can come up against an ancient problem--finally creating a machine for tending the vegetables and harvesting them, and the city would not have to send thousands of people to the vegetable fields. Only then would the stores have a bright palate of collars of vegetables. Only then will the disorganized market, encountering a competitor, weaken its far-from friendly grip.

In November (1981) the Plenum of the CPSU Central Committee discussed improvement of the system of production and procurements of agriculture products and emphasized that the task of today is to preserve and not allow losses of the crop that has already been raised. But why can there be losses of vegetables, which are in such short supply on our tables? For vegetable plantations in the country occupy 1.3 million hectares or 50 square meters per capita, that is, a half-hundredth per person. Is the branch really operating in such a disorderly way that it cannot utilize all the gifts of this piece of ground?

No, it is not a matter of disorderliness, although it does exist. It is mainly a matter of the peculiarities of the branch of vegetable growing, those peculiarities which even good intentions transform into a muddle. How the products be harvested promptly if the vegetables all come rightly in a fairly short period of time and they must be gathered simultaneously? And almost all of them--by hand.

There is another conflict--between the assortment and specialization. The first and major requirement on vegetable growers is the plan, quantity. More! let there be a more or less narrow specialization and concentration of production. Having entered on this nature path, the farm immediately is in conflict with trade and the procurement workers. Imagine that a vehicle has left the sovkhos loaded to the hilt with parsley. Not a single trade point needs this much. It is necessary to shift the green product throughout the entire city. And it is immense, taking the driver the entire day to get from one end to the other. In the heat the green product wilts. It is returned. And all of it is not worth the gasoline that is expended! It is not simpler to simply throw it away or not to harvest it at all? In the plan the plantation designates that it will be responsible in terms of the gross volume and thinks about 10 tons of parsley. It is possible to do without it. And the city dwellers go to the market for the unfortunate parsley, and given 2.5 rubles for a bunch of it.

A specialized sovkhos cannot give the housewife a little of everything for her table, the proper selection. He can only store up either sorrel or beets or carrots--individual. And only at a particular time of the year.

The situation has taken shape in such a way that simply specialized sovkhoses by themselves cannot fully satisfy the demands of the consumer and become

competitive on the market. It is not a matter of the overall quantity of vegetables. It is a matter of their assortment and the time periods of their delivery. Of the 35 kinds of garden products that are raised on specialized farms of the Ural area, about 80 percent are of three kinds--cabbage, potatoes and beets. All of the delicatessen items--dill, spinach, rhubarb, sorrel, and so forth--do not count for the farm and therefore the farms are indifferent to them. Most of the vegetables--no less than half of them, in any case--go to the city within a small time period--September-October. But the counters require, on the one hand, diversity, and, on the other, uniform arrival of the vegetables, preferably throughout the course of the entire year. The bazaar takes us into account, but the vegetable industry does not, so far.

It is not necessary to invest money in expanding vegetable growing on open ground with its noncyclical, one-time production. The extensive path will never lead to success. It is necessary to have well-mechanized plantations, to develop vegetable growing on open ground taking advantage of surplus energy from industrial enterprises. Finally, it is necessary to improve the system of procurement, processing, and storage of vegetables, as this is done, for example, in Kurgan.

And only in this case will the market not dictate its own prices, and the stores will be able to compete successfully with them.

Thanks to the City Market, But....

The first bazaar I ever saw in my life was the most memorable of all. I walked through it hand-in-hand with my mother with my mouth wide open. It was at the end of the first winter after the war in the Moscow area. A scoundrel salesman was shooting from a wooden pistol a wooden cork on a string and shouting: "Children's Luxury! A pistol! Built to last a hundred years!" I wanted to buy a lot, but my mother did not have much money.

When we made our way out of the crowd she said:

"Oh boy! Just like in the Torgsin [All-Union Association for Trade With Foreigners]--everything is here!"

"But what is a Torgsin?"

"There was such a store before the war."

"There were stores that were so fantastically rich in those days which were joined together by the word 'Torgsin,' which meant--trade with foreigners. Although today's disorganized market is certainly not a Torgsin I frequently think: Who is the foreigner here? That one in the 'airport' cap? That one in the thick of felt robe which is belted with a bright-colored scarf? Or perhaps that one with the cagey glance and the soft letter "G". Or perhaps me?...

It is probably me. Because of how politely but firmly they take money from me for every trivial thing, it is undoubtedly me. Am I really a millionaire in order to be able to buy early tomatoes at 10 rubles per kilo, cucumbers in the

autumn at 2 rubles, and microscopic bunches of greens at 2.5 rubles? In this case the soup is cheaper than the seasoning. And the soup itself is not inexpensive either....

The market knows its business. Nobody will bring bread or sugar here. Here they have vegetable and potatoes, meat and fruits, flowers and honey. The market does not know about specialization. It provides that which cannot be provided in abundance by state trade. It fills in the blanks and takes the price from our pocket.

But this frequently helps us and saves our time. It is one thing to run from store to store in search of what we need for the table and another thing to purchase everything we need at the market. But the prices.... It is no wonder that from time to time they try to regulate them, first here then there. These attempts are never crowned with complete success. Regulate the sales prices of the commodities and the market will empty out. It is disorganized so that there will be free prices here. If there is not enough of something, a shortage, the value of this commodity will rise, and if there is a lot of it--it will drop. For nobody sets the price for the market himself. It is determined by the demand. I understand this with my mind. A rational decision, which is acceptable scientifically. Commodity-monetary, including market, relations are not abolished under socialism. And there are still prices and more prices....

It is necessary to fight the market with its own weapons and develop at more rapid rates the production of those products for which we go to the bazaar. The market is a barometer. We are thankful even for this.

To be sure, the market has what seems to be another function--the rural areas sell their surplus products to us here. At the central entrance there is a sign "Kolkhoz Market." But one rarely finds kolkhoz workers at the market..."

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PERSONNEL MANAGEMENT WORK DISCUSSED

Novosibirsk EKONOMIKA I ORGANIZATSIYA PROMYSHLENNOGO PROIZVODSTVA (EKO) in Russian No 11, Nov 84 pp 166-171

[Article by L. D. Kudryashova, candidate of psychological sciences (Leningrad): "The Subordinates Whom We Choose"]

[Text] Although the psychology of management is one of the youngest disciplines and is still in the stage of being established, it has in its arsenal means which are capable of improving work with management personnel. Let us try to describe the main methods of evaluating managers, which can be used at enterprises, and to analyze their merits and shortcomings. To do this let us arrange a unique mental experiment--we shall hear a conversation between a psychologist and an enterprise director, the subject of which is evaluation of management personnel.

Psychologist: Today, because of a number of factors, the problem of evaluating the effectiveness of the activity of the manager has become crucial. It is impossible to solve this problem without utilizing scientific methods.

Director: But, after all, practice has already developed sufficiently reliable criteria for evaluating managers, on the basis of which the personnel policy is being carried out. We proceed from an analysis of questionnaire data (education, age, length of work service and so forth) and we also take into account the results of their preceding activity. If a person has worked in one position or another for a long time, his subordinates, colleagues and superiors form a substantiated opinion of him, as do party, trade union and Komsomol agencies. If the opinion is positive one can draw the conclusion that the individual will continue to work well either at his previous job or at a higher one.

Psychologist: You have spoken about the practical (or traditional) evaluation of management personnel. Today this is the foundation for work with personnel at the majority of enterprises. But the traditional evaluation has some shortcomings that cannot be eliminated. It takes a long time to form an opinion about a manager: in rare cases--several months, and more frequently--several years. And the higher the occupational status of the manager, the more time is required to evaluate him. In this sense it is conservative, since it does not make it possible to rapidly correct mistakes in personnel

transfers. And it sometimes costs a great deal, especially at high job levels. Nor is it possible to recognize a strong manager immediately. It is therefore no accident that the so-called stagnation of personnel is widespread, when managers achieve the ceiling of their job status 5-10 years after the age at which creative activity flourishes (that is, 35-40 years). And how does one recognize management capabilities in young specialists who have just come to the enterprise? As experience shows, many appointments of these people to management positions turn out to be wrong.

The second essential shortcoming in the traditional evaluation is its prognosticatory weakness. Strictly speaking, we cannot determine a worker's creative potential by judging him from the results of his past activity. The fact that a candidate's work has not always been successful can be a reason for promoting him. When transferring a manager to a higher position one should recall the so-called Peter Principle, the tendency to promote managers above the level of their competence.

Director: These shortcomings can be eliminated if one utilizes the method of expert evaluations of the qualities of the manager. Plant sociologists and psychologists, having studied the literature, can construct a model of the ideal manager, having drawn up the list of qualities that are necessary for successful management. Among them are initiative, demandingness, discipline, energy, efficiency, honesty, responsibility and so forth. These qualities are periodically evaluated by competent experts and this evaluation is used in the system of certification of managers which is conducted regularly at our enterprise. You will agree that an analysis of these qualities goes beyond the framework of accounting for the results of past activity and makes it possible to judge the creative potential of the worker.

Psychologist: Indeed, augmenting traditional methods with the method of evaluating qualities is a step forward. For a long period of time it is no longer necessary to evaluate the qualities of a manager, and by knowing them one can foresee the success (or lack thereof) of his future activity. But it is no secret that in addition to the spreading of this method at enterprises one encounters ever more frequently well-substantiated criticism of it.

In fact, the evaluation by experts of one quality or another depends to a large extent on its interpretation. Various experts understand, for example, "efficiency" in various ways, and invest various kinds of content in this quality of the personality. Such arbitrariness is also inevitable in quantification (point evaluation) of each quality. Moreover, there are very many qualities of the personality and to select those which "actually" determine the effectiveness of management activity is fairly arbitrary. But it is not very important that it is possible to construct a multitude of models of the "ideal" manager. The problem is that we still do not know whether or not the manager who has all the qualities of the ideal model will be a strong manager!

The doubt is based on the fact that up to now we have not managed to find a model which would make it possible to explain why certain leaders in history were outstanding--all of them had different sets of qualities.¹ Moreover, there are frequent cases in which people with a "good" set of qualities are

not outstanding managers and, conversely, strong managers have a "poor" or "medium" set of qualities. Sometimes the matter becomes paradoxical. The press has repeatedly reported cases of managers (mainly of the middle level) who are vulgar, who yell at their subordinates, and who do not look into things carefully. But their superiors think that they have promise.

While utilizing the method of evaluating qualities, one must also recall its shortcomings.... It is not by accident that management specialists attach such great significance to the development of the criteria themselves.

Director: Any business executive, when selecting his subordinate managers of lower ranks and specialists, takes advantage of the empirical criteria for evaluation whether he knows it or not. Everyone has his own arsenal of these criteria. For example, I consider it important to clarify the conditions under which the person became a candidate and to take into account who his "teachers" were (in particular, under whose leadership he has worked in the past). I also use this criterion: "The subordinate must consider the work more important than the salary." When possible, we offer the candidate a choice of two positions. One has lower pay but corresponds more to his interests (one can judge the latter from the answers on questionnaires, the results of preliminary conversations and so forth). The other position, conversely, has higher pay, but does not quite coincide with the candidate's interests. If the candidate prefers the higher pay, we usually regard this as one of the arguments "against."

In one of the conversations I showed a potential associate a list of vacancies in which two positions were underlined: one with a salary of 200 rubles, and the other--230 rubles. While covering up the names of the actual positions with my hand, I asked the candidate which position he preferred. Without hesitating he indicated the larger salary. A good worker would have been interested first in the nature of the work, and not the amount of the wages. Although in the end this candidate was hired, he turned out to be, as one could have expected, a mediocre workers.

Psychologist: You have given an example of the so-called situation test. This kind of test is an artificially created (frequently conflicting) situation in which the candidate must determine his position. Sometimes the employment interview is conducted in deliberately harsh tones, the candidate is subjected to undeserved criticism, the difficulties he will encounter if he receives the desired position are exaggerated, and so forth. With the help of situation tests the candidate is evaluated according to the results of his actual activity, and not according to his ideas about it. Therefore such tests can give information which cannot be "extracted," say, in conversation. But the inadequate behavior of the candidate in an artificially created situation can be explained not by the lack of the necessary capabilities, but by the special psychological condition, the effect of the unexpected, inadequate experience, the extraordinary circumstances, and so forth.

Situation tests frequently embody various empirical criteria for evaluating other candidates. But not all of them are equally good. Sometimes managers make a formal or superficial judgment, evaluating the candidate according to

whether or not he evokes sympathy, whether he is able to restrain himself, whether or not he has extravagant clothing, and so forth.

Director: This is probably true. But I must note that the ability to show restraint is a quality of no small importance, not only for the manager, but also for the person doing the evaluating. It seems to me that it all boils down to the fact that empirical criteria cannot be utilized irrespective of the nature of the position or the rank of the worker. One and the same criterion can be good, for example, when selecting a technical secretary and poor when selecting a shop chief. I shall give an example.

One time the chief of a personnel division discovered an incorrectly filled-out document which was signed by one of the shop chiefs, and he prepared a draft of an order for reprimanding him for making a mistake in business correspondence. The shop chief, having learned about this, ran in and took out the bad document, wanting to replace it with one that was correctly filled out. Thus he destroyed the basis for the reprimand. This bothered the personnel worker, and he told me: "The shop chief is a lousy manager! He did something dishonorable because of a trivial matter. I would fire him!..." I said that although I do not approve of this kind of action, I think that in this case it is inadmissible even to raise the question: a reprimand for filling out one business document. The shop chief is not good at correspondence, and the most he deserved was an oral remark about this.

Psychologist: It turns out that it is important not only to develop effective criteria for evaluation, but also to be able to utilize them.

Director: In practice the situation is thus: a strong manager uses good criteria and applies them correctly, and a weak one, conversely, either prefers secondary criteria or is not able to apply those which have proved to be good. If the plant subdivision is headed by a strong manager, I would gladly "farm out" the selection and placement of personnel, being confident of the effectiveness of the personnel policy he followed. But if the manager is average, or even more so, weak, then he must constantly be "corrected" in solving these problems.

Psychologist: There is a kind of law for working with personnel--the so-called "Effect of Self-Organizations" of the management system. It says: a strong manager selects strong subordinates and, conversely, a weak manager elects one. According to this law, the strong manager, in time, will improve the personnel structure of the subdivision of which he is in charge, and under the weak manager it will deteriorate. Therefore it is extremely important that questions of selecting and placing management personnel be resolved by people who themselves are strong managers. Otherwise regardless of what perfect criteria for evaluation may have been developed by the practice and theory of management, they will not be effectively utilized.

FOOTNOTES

1. See: Kuz'min, E. C.; Volkov, I. P., Emel'yanov, Yu. N., The Manager and the Collective. Leningrad, 1974, p 74.

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QUESTIONS ON BRIGADE FORMS OF LABOR

Novosibirsk EKONOMIKA I ORGANIZATSIYA PROMYSHLENNOGO PROIZVODSTVA (EKO) in Russian No 11, Nov 84 pp 172-173

[Text] In 1983 the CPSU Central Committee adopted the decree, "On Further Development and increased effectiveness of the brigade form of organization and stimulation of labor in industry." In keeping with it a decree was issued by the USSR Council of Ministers and the AUCCTU, "On Measures for Further Development and Increased Effectiveness of the Brigade Form of Organization and Stimulation of Labor in Industry," No 1125. The questions and answers presented below are compiled from these decrees.

Questions

1. What tasks are carried out by the brigade forms in the modern stage?
2. What initiatives and undertakings are recommended for the development of socialist competition among brigades?
3. The decree of the CPSU Central Committee points out the need, taking into account the specific features of the branches of the national economy, to develop experiments for introducing new collective forms of labor. What is the essence of the Novosibirsk experiment which was conducted in 1984-1985?
4. The additional payment for managing a brigade with more than 15 people which is paid to a brigade leader who is not released from his main job is increased to 2 percent of the sum of wages of the brigade (not including bonuses). Is there a maximum amount of this additional payment?
5. In what amount do they envision the additional payment to team leaders who are workers who have not been released from their main job, when the team includes five people and more?
6. How is it intended to provide incentives for foremen and production organizers to increase labor productivity as a result of introducing the brigade form?
7. In industry the production brigades are granted the right to increase the additional payment to students in excess of the amounts established by

existing provisions. Within what limits are the amounts of additional payment established?

8. What does the work for preparing for the introduction of brigade forms consist of?

9. Which specialists who have been brigade leaders are to be trained by the USSR Minvuz in conjunction with the interested ministries?

10. A special agency has been created for studying scientific-methodological and organizational problems in improving the brigade form and coordinating the work of the ministries and departments in this area. What is this agency?

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BOOK ON FINANCIAL RELATIONS REVIEWED

Novosibirsk EKONOMIKA I ORGANIZATSIYA PROMYSHLENNOGO PROIZVODSTVA (EKO) in Russian No 11, Nov 84 pp 174-180

[Review by E. G. Sinyavskaya, candidate of economic sciences, Novosibirsk State University imeni Leninskiy Komsomol, of the book "Long-Range Financial Planning" [Perspektivnoye Finansovoye Planirovanaye] by L. P. Yevstigneyeva, Moscow, "Nauka", 1982]

[Text] In economic literature finances are regarded as a complex system which is studied from various sides. Many scientific publications are devoted to the theory and practice of socialist finances--the development of financial balances, long-range financial planning, the formation and utilization of financial resources, the application of financial credit levers in the interests of increasing the effectiveness of production, and so forth. So far there is no single opinion about socialist finances as a category of political economics, and many economists understand these to be not only statewide monetary relations (state finances), but also those economic relations which are conditioned by the turnover of money.

This is the position taken by the author of the monograph under review, which is a theoretical investigation of the methodological problems of finance and credit relations in the economic mechanism. L. P. Yevstigneyeva emphasizes that finance and credit relations are "built in" to the economic mechanism, and its improvement presupposes the development of finance and credit forms as well as financial planning.

Recalling the questionable aspects in this definition of the category of finances, the author interprets finances as a broad concept which embraces all monetary funds of expanded reproduction in the national economy (p 6). From this standpoint socialist expanded reproduction is regarded as the interaction of three cycles which correspond to three levels of the national economic hierarchy. At the level of the national economy one analyzes the cycle of the global social product in its reproduction structure, the formation of funds for reimbursement, accumulation (production and nonproduction) and consumption. For the system of local economic units the cycle of the produced product is related to the formation of the production cost and profit. Finally, for the individual consumer the cycle of funds includes the movement of consumer income in monetary form.

An analysis of the peculiarities of the cycles from the historical point of view enabled the author to introduce the concept of the type of balance which is characterized by a particular interaction of the three cycles of the funds for expanded reproduction. Particular financial credit forms correspond to the various types of balance. As was said in the introduction, "the composition of financial resources, credit relations, price and cost accounting comprise a historically determined complex which is adequate to the type of balance" (p 11).

The author of the monograph gives this methodology for analyzing the finance and credit relations in developed socialism and the position and role of long-range financial planning with a differentiation of the types of balance. The selected approach corresponds above all to the political and economic direction of the work, but the results of the analysis are of interest for economic practice as well.

L. P. Yevstigneyeva addresses the theory of the interconnection between financial and credit relations and expanded reproduction under socialism. In keeping with the type of balance, the author analyzes three abstract economic systems which could be called models of the interconnection between financial forms and the circulation of funds in expanded reproduction. The analysis proceeds in terms of the indicators of the economic system: the criterion of effectiveness, the type of price, the conditions for capitalist investments, the forms for providing planning assignments, the distribution of profit, the system of payments into the budget and so forth.

The formation of finances during the course of the circulation of the global social product as a whole corresponds to the first type of balance; cost accounting is not developed and embraces only the sphere of simple reproduction. Reproduction of an individual production is provided by budget financing. Such an economic situation, as has been shown, corresponds to the extensive type of expanded reproduction during the period of industrialization of the national economy.

There is a great deal of content in the conclusion that in the new stage production capital becomes an initial and independent object of planning. The circulation of funds of the cost-accounting unit is separated from the circulation of financial resources of the national economy. Cost accounting is deepened and, as distinct from the first type of balance, embraces not only the phase of production, but the entire circulation of the funds of the cost-accounting unit.

9. The author is undoubtedly right when she notes that "the cost-accounting form of circulation of production capital presupposes expansion of the sphere of self-repayment through capital expenditures and the inclusion of the processes of self-financing, as a rule, in the form of complete or partial return of the allocations from the budget and extensive utilization of a bank investment credit" (p 27). The development of cost-accounting independence of the enterprise presupposes an increase in the role of long-term planning and stable normatives in the five-year and annual plans, and improvement in price

setting with more precise accounting for socially necessary expenditures of labor.

With the second type of balance the significance of financial and credit forms of management increases, and namely there is an increase in the role of profit in state financial resources with a limited significance of turnover. The system of financial normatives develops in the form of resource payments from profit and production cost, normatives for the formation of cost-accounting funds from Profit, and to forth.

L. P. Yevstigneyeva discusses in detail the peculiarities, the interaction and the contradictions between the two variants of the second type of balance. The contradictions are resolved when moving to the third type, for which it is difficult to have a unity of physical and substantial, value and financial proportions of expanded reproduction. A high level of development of productive forces on the basis of complete mechanization and automation using electronic computers corresponds to this. The author thinks that, although this stage has not yet arrived, it is necessary to analyze it even now in order to understand the role of commodity-monetary and financial relations in increasing the effectiveness of production.

The third type of balance is distinguished by a unity of the three cycles during the course of the expanded reproduction and a combination of the three financial substances: the circulation of the global social product in its reproduction structure, the circulation of the funds of the enterprises and the formation of final consumer incomes. From the political economic standpoint the author draws an essential conclusion to the effect that with a combination of the financial subsystems the growth of wages is coordinated not only with the growth of the consumption fund in the final social product, but also depends on the growth of profit of the cost-accounting unit if the increase in profit is conditioned by an increase in the social productivity of labor in this unity (p 62).

L. P. Yevstigneyeva does not avoid disputed issues which are being discussed extensively in economic literature. She discusses, in particular, the models of prices which are inherent in various type of balance.

The author initially regards the concept of expenditures price without the capital constituent which reflects the average expenditures of labor, and then she analyzes the prices of balance, the prices of production, with differentiated normatives, and, finally, the prices of production of a single level. Although no small amount of attention is devoted to the possibilities of utilizing the aforementioned models of prices in the practice of management, many of the issues that are touched upon apparently need more serious substantiation. For example, when speaking about the price of balance Yevstigneyeva describes it as an initial, undeveloped form of the price of production (p 37), thinking, probably, that the "developed form" is the price of production of the single level, where the "commodity and monetary mechanism for average profitability according to the capital supports the national economic need to average the maximum effectiveness and the resource payments associated with it" (p 53). Yet in economic literature the prices of balance are usually associated with optimization of the national economic plan since

these prices correspond to the balance of natural-substantial and value proportions in the national economy, particularly to the balance of supply and demand. Correctly assuming that the type of price is related to the criterion of effectiveness, the author denies this property to prices of the optimal plan, although it is prices that correspond to the evaluations of the optimal plan and act as a "measure of realization of the criterion" (footnoted on p 81). As a result the author draws a conclusion which is unjustified, in our opinion, to the fact that the annual plan does not have independent economic significance. Here, apparently, the author shares the opinion of those economists who think that prices of the optimal plan are severed from the actual process of the formation of socially necessary expenditures of labor and value in the national economy or, in the author's words, "They leave this process outside" (p 132).

L. P. Yevstigneyeva analyzes the functions of finances with the various types of balance and convincingly shows that their traditional functions (distribute and control) are dependent and in the future will be changed into functions of balance, isotropicity and norm setting. The three functions of finances are related to their content as a monetary form of accumulating resources of expanded reproduction.

The first function means the participation of finances in balancing national economic proportions on the basis of the priority role of indicators of the circulation of production capital. One is speaking, consequently, about the priority of financial normatives of reimbursement, accumulation, physical wear and obsolescence of fixed production capital among other indicators of the production of the global social product.

The function of isotropicity presupposes that the financial and credit relations provide for the receptivity of public production to the national economic criterion of effectiveness. By the criterion of effectiveness the author means the national economic value of the indicator defined as k/m (m --value of added product, k --value of advanced production capital).¹ The value of the indicator is used as a planning amount for whose achievement the activity of the cost-accounting units is oriented. It seems that here the author unjustifiably narrows the problem of the national economic criterion of effectiveness and reduces it to one of the possible quotients of the indicators. The selection of the term for designation this function of finances is unfortunately. The concept of isotropicity, which the author borrows from natural sciences, does not make the content of this function more comprehensible].

The third function of finances--normative--is understood as financial provision of unity of the processes of reimbursement and accumulation of production capital and their effective utilization for stabilizing the circulation of funds at optimal level.

From an analysis of the circulation of funds from expanded reproduction and the functions of finances related to it L. P. Yevstigneyeva draws her conclusions on the directions for improving cost accounting. She notes that with the existing type of balance centralized regulation of capital investments should be combined with the development of complete cost

accounting in the sphere of capital construction and with more extensive utilization of the bank and credit system and combined capital investments (p 73). It is necessary for the national economic plan to include as a subsystem the investment plan which is based on indicators of the circulation of production capital. The enrichment plan determines the financial normatives for reimbursement and renewal of production capital and makes it possible to affect the national economic plan through these normatives (p 77).

L. P. Yevstigneyeva is logically consistent when she notes that under the conditions of the third type of balance budget financing is crowded out from the sphere of mass production (p 84). The resources for expanded reproduction will be formed from returned budget capital investments, bank credit and internal funds of the cost accounting associations or ministries. In the opinion of the author, the resources should be advanced centrally, which will be promoted by the participation of large cost-accounting associations in the drawing-up of long-term and medium-term programs for the development of the national economy and the development of the system of economic agreements (p 84).

The author draws attention to the need to reinforce the role of credit in the economic mechanism. Credit should become a form of state advancing of money return (p 86), which will mean deepening cost-accounting and further developing financial and credit relations.

The integrated theoretical concept is completed by an investigation of the role of the financial planning under modern conditions. L. P. Yevstigneyeva substantiates the financial approach to long-range national economic planning.

In the definition of the author, the "financial approach to planning is a specific method for socialism to regulate consistently the intensive type of expanded reproduction when the material prerequisites have matured sufficiently, primarily from the aspect of productive forces, and when there is a need to plan in complex the processes of reimbursement and accumulation and the structure and dynamics of national production capital and their effectiveness" (p 125). Consequently, the financial approach means that the object of long-range national economic planning instead of the global social product is becoming the production capital. "This makes it possible to have global regulation of effectiveness and quality on the basis of the planning strategy for technical development and the formation of prerequisites for a stable tendency for capital-intensiveness to drop" (p 126).

L. P. Yevstigneyeva presents long-range financial planning as drawing up a system of financial plans (p 138). At the upper level it is necessary to have a material-financial balance of production capital which is oriented toward adopting a strategy for scientific and technical progress. It will give the most important value normatives for expanded reproduction which are used at the next level when drawing up the balance of financial resources in the totality of aggregate economic units and also the consolidated balance of income. At this stage one clarifies the branch structure of the social product, production capital and labor force. Taking into account the data from the preceding system of balances, one concretizes the balance of consumer

incomes and determines the structure of production taking into account supply and demand.

The book elucidates complicated and crucial problems and contains interesting and profound ideas, which are sometimes debatable, but which undoubtedly deserve the attention of specialists both in the area of finance and in the area of political economics.

FOOTNOTES

1. The author calls this ratio the norm of effectiveness. --E. S.

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NEW JOURNAL ON SCIENTIFIC AND TECHNICAL PROGRESS

Novosibirsk EKONOMIKA I ORGANIZATSIYA PROMYSHLENNOGO PROIZVODSTVA (EKO) in Russian No 11, Nov 84 pp 180-182

[Article by Yu. P. Voronov, candidate of economic sciences: "A New Bridge in Scientific and Technical Progress"]

[Text] This year was marked by the publication of the first issue of a new scientific-technical and production journal, MIKROPROTSESSORNIYE SREDSTVA I SISTEMY. The first domestic mass journal on electronics is being published by the USSR State Committee for Science and Technology. The editor in chief of the new publication is Andrey Petrovich Yereshov, a corresponding member of the USSR Academy of Sciences, chief of the division of the computer center of the Siberian branch of the USSR Academy of Sciences. He has already presented his credo for the EKO readers in the article entitled "Programming--A Second Literacy."

The first issue is opened with an address to the readers from Academician Ye. P. Velikhov, the vice president of the USSR Academy of Sciences. In it he notes that one of the main problems on the path to extensive introduction of microprocessor equipment is--"the barrier of mutual misunderstanding, which separates the developers of microprocessors systems from specialists in those areas of application where microprocessors are necessary or can be useful."

With these words he set the composition of the potential reading audience, but it is a minimal composition. We know the great popularity enjoyed by the translated magazine ELEKTRONIKA among developers and production workers. Many read it even if the content of the articles is not applicable to their current work simply in order to keep up with the latest events in the vanguard of scientific and technical progress. The new Soviet magazine is not yet a competitor for ELEKTRONIKA: it will be published only four times a year and the circulation of the first issue is insignificant--only 5,000 copies. But this is only for the time being. The need for such a magazine, without exaggeration, is immense.

The magazine is intended to cover the categories: microprocessors equipment, software, technology--production--reliability and application of microprocessors in the CEMA countries, news about microprocessor equipment, the training center and others.

In order to give the readers an idea of the new magazine, we shall discuss several of the articles in the first issue. Its brief lead article, "Microprocessor Equipment and Automation of the National Economy," was written by the deputy chairman of the State Committee for Science and Technology, A. K. Romanov. The article discusses the main areas of application of microprocessors and microcomputers, and the unified target comprehensive program for the utilization of microprocessors which was adopted at the end of last year.

Subsequent articles of the issue can be included in one of two classes: educational or special. There are appreciably more of the former. In the article by B. N. Naumov and A. V. Giglavyi, participants in the development of the unified series of SM series of computers for the CEMA countries, they discuss the structure of microprocessor equipment and suggest a three-level principle for forming this structure. They also develop the idea of coordinated development of the element based and software. The article by V. M. Proleyko is devoted more to the history of microcomputers and remote equipment. This subject is also developed in the article by V. A. Shakhnov, which is a little more specialized and discusses various variants of microprocessor sets. The last two articles touch indirectly on questions of applications of microprocessor equipment. In the issue there are also articles that are completely devoted to concrete applications: in robot equipment and in remote changes.

In a set of four articles they consider the most crucial problem of the introduction of personal computers. The initial article of the group, "Who Needs a Personal Computer and for What?" is laconic and is a sample of addressing production workers. Its author is a corresponding member of the USSR Academy of Sciences, S. S. Lavrov. To the first part of the question asked in the title he answers directly: "Everyone except for children and directors of enterprises." It would be hard to find even one director who will not read this article after that answer. The other articles in the group are more diffuse, and include an article about personal computers of the Agat series for mass consumption, and about software for personal computers for working with schoolchildren. Its fundamental nature distinguishes the article by the secretary of the magazine, G. P. Gromov, "Personal Calculations--A New Stage in Information Technology."

The section entitled "Scientific Center" includes an article on a particular subject--the structure and applications of the program timer KR580I53. But in general all of the articles in the issue are educational to a certain degree, for everyone needs to learn a lot about mass introduction of microprocessors.

The journal includes many annotations and review of books, there are announcements about conferences and from pavilions of the VDNKh. A mandatory item in a new undertaking is an entertainment section (it is called the "MP Pentagon) which is a reprinting of the aphorisms of Arthur Blokh from EKO. The journal has multicolored cover and inserts. The price for one issue is 1 ruble, 10 kopecks. Subscription to the journal will not begin until 1985. It is recommended that those who wish to receive a set of issues for this year send payment to the address: 101820 Moscow, Proyezd Serova 5, editors MP.

And a last piece of advice to the future readers of the new magazine: make a note of how many times they promised to increased labor productivity because of microprocessor systems. In the first issue there are two figures: 1.5-fold (p 5) and 3-5-fold (p 89). The latter is according to data of the VDNkh.

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ANSWERS TO QUESTIONS ON BRIGADE FORMS OF LABOR

Novosibirsk EKONOMIKA I ORGANIZATSIYA PROMYSHLENNOGO PROIZVODSTVA (EKO) in Russian No 11, Nov 84 pp 183-184

[Text] 1. Brigade Forms Under Modern Conditions are One of the Directions: For Increasing the Effectiveness of the Operation of Enterprises; Extensively Enlisting Workers in Production Management; and Education.

2. It is recommended that socialist competition be developed among brigades in keeping with the initiative of the Moscow workers ("1 Percent More and 1 Day Earlier"), the Leningrad workers "From High Quality of Work of Each--To High Effectiveness of Labor of the Collective"), the Kharkov workers ("The Assignment of the Five-Year Plan--without increasing resources"), the workers of Latvia ("For High Quality of Labor in Each Work Station"), and the Sverdlovsk workers ("A Five-Year Assignment for the Brigade with Fewer People").

3. The essence of the Novosibirsk experiment consists in the formation of contract collectives at a level higher than the brigade--sections, shops and other subdivisions, including managers and specialists for improving the method of the Elektrosignal Plant (see EKO, No 3, 1984). The collectives are granted the right to distribute all of the wage rate or the salary of the worker who is released.

4. Yes, there are. The maximum amount of the additional payment for management of a brigade with more than 15 people is 40 rubles.

5. Under the condition that the brigade fulfill the production assignment and provide for high quality of the products and additional payment is introduced for the team leader in the amount of 50 percent of the additional payment envisioned for the brigade leader.

6. For foremen of production sections and engineers for organization of norm-setting of labor, if they have high qualifications and develop and implement measures for increasing labor productivity, increments are established in the amount of 50 percent of this salary from the savings on the wage fund which is received as a result of the introduction of the brigade form.

7. The amount of the increase of the additional payments for students is determined by the brigade collective, taking into account their contribution to the overall results and within the limits of the piece-rate earnings of the brigade.

8. The work for preparing for the introduction of brigade forms is extremely diverse. It includes: improvement of intrabusiness planning, technology, organization of production and labor, and systems of paying for it; determination of the responsibility of managers and engineering and technical workers of the shops, divisions and services for the creation of conditions for highly productive labor of the brigade; explanatory work and accounting for moral and psychological factors; rearrangement of the structure, forms and methods of work, of party, trade union and Komsomol organizations; provision for unity of ideological, organizational and economic activity.

9. In VUZes and secondary specialized training institutions workers have been instructed to organize the training of engineers and technicians as production organizers in the shortest possible periods of time. From among skilled workers who have worked as brigade leaders for no less than 3 years and have a secondary specialized or incomplete higher education they are to train engineer-organizers of production, and from those who have a secondary education--technician-organizers.

10. Under the USSR State Committee for Labor and Social Problems they have created an interdepartmental council of representatives of the AUCCTU, the ministries and departments of the USSR, the USSR Academy of Sciences and the All-Union Znaniye Society.

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MAGNITOGORSK READERS HOLD CONFERENCE

Novosibirsk EKONOMIKA I ORGANIZATSIYA PROMYSHLENNOGO PROIZVODSTVA (EKO) in Russian No 11, Nov 84 pp 185-186

[Text] In Magnitogorsk, on the initiative of the CPSU Gorkom, a conference of EKO readers was held in the House of Political Education. About 10 people spoke at it, including the deputy director of the metallurgical combine, Candidate of Technical Sciences Yu. V. Levin, the director of the branch of the IPK of the Ministry of Ferrous Metallurgy, Yu. V. Mironov, the chief of the division for ASU of the Calibration Plant, N. N. Chevchenko, a docent of the Mining and Metallurgy Institute, G. G. Levina, and others. The conference was conducted by the secretary of the party gorkom, V. M. Metelkin. The magazine was represented by a member of the editorial board, V. D. Rechin.

First let us single out the suggestions of a general nature that were expressed by participants in the conference during the course of the discussion.

Many production managers, as before, do not pay enough attention to economics and assign it a secondary position. What is economic thinking and how is it distinguished, for example, from technical or humanitarian thinking? The readers are expecting an answer to this question from the magazine.

The desires expressed regarding the section of the magazine. Participants in the conference said that several years ago EKO actively developed problems of increasing the skills of engineering and technical personnel, as a result of which it drew the attention not only of instructors of IPK's and FPK's, but also of the readers. But recently there have been considerably fewer articles on this subject. This is hardly justified.

The majority of VUZ instructors of economic disciplines use EKO in their work and recommend individual articles and selections to students. Thus a new audience is being prepared for the magazine and it is necessary to take them into account fully.

In the section entitled "Responses" there are not enough official responses. The editorial staff should make sure that there are responses to specific recommendations made in the magazine and they should be published, accompanied by their own comments.

Criticism of specific articles and particular remarks. Among the magazine's successes one can include the discussion of the article by I. I. Usacheva (No 1 for 1983), although individual statements were weak. Workers in Magnitogorsk read with interest the commentary by N. Tereshko, "Magnitka: What Is Over the Horizon?" (No 3 for 1984). Unfortunately, there are a number of imprecisions in it: the author described events that were approximately 5 years old and presented them as if they had taken place in the present. The editorial staff should check materials better before publishing them.

In EKO, as in other economic publications, when analyzing the effectiveness of reconstruction they frequently rely on the fact that it requires relatively fewer capital expenditures than new construction does. Yet in many cases this is incorrect. Planned (and normative) expenditures on reconstruction are frequently artificially reduced, as a result of which many difficulties arise when it is being carried out. And the effectiveness of reconstruction lies primarily in the fact that the invested funds are recouped more rapidly. The period of assimilation of new capacities is minimal.

There are not enough articles in the magazine which consider the legal aspects of economics.

The form in which the materials are presented was also discussed at the conference. The clarity of the presentation is one of the merits of the magazine and it should be valued. But from time to time there are still articles which are written in some pseudoscientific style. They should be more thoroughly edited. For if the material is not interesting in itself or is poorly presented, there are few who will read it. Here is how one of the participants in the conference becomes familiar with the published articles: he reads a long article completely only when the first 5 pages are interesting. Thus the first pages perform a kind of additional function--a "visiting card" for all the rest of the material.

Judging from the increased number of subscriptions, the popularity of the magazine continues to grow. But this does not mean that there is no longer any need to be concerned about it. As usual, we need articles that are like production novels or recommendations on how to arrange business relations and so forth. As before, many readers take up the magazine precisely to read articles like this. They pick it up and discover that it is useful to them mainly because of other, more serious materials. And they become readers and friends forever.

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PRODUCTION QUALITIES OF FOREMEN EVALUATED

Novosibirsk EKONOMIKA I ORGANIZATSIYA PROMYSHLENNOGO PROIZVODSTVA (EKO) in Russian No 11, Nov 84 pp 187-189

[Article by S. Pugachev: "Master and Situation"]

[Text] We are offering a psychological session for evaluating your capabilities of working as a production foreman. The practical session will consist of describing concrete situations for which, when you analyze them, you will have to make a decision from the standpoint of a production foreman. (Remark: Optimal decisions can be found more quickly by those who are not without a sense of humor.)

Variants of Solutions

Situation Fig 1

One of your subordinates has openly expressed dissatisfaction with your activity and gets you to understand that it would be better if you changed places with him. How to you deal with such a subordinate?

Fig 1. Pay no attention to his words.

Fig 2. Give a public reprimand indicating the inadmissibility of such actions.

Fig 3. Transfer the subordinate to another job.

Fig 4. Try to recommend him for agricultural work.

Situation Fig 2

Guests from another enterprise have come to see you, the section foreman, to become familiar with experience in organizing work which you have shared on an information sheet. During the conversations with the guests a worker whom you have recently punished comes in and states that the material on the sheet does not correspond to reality. How do you deal with this?

Fig 1. Ask the person who has come in not to butt into the conversation and to leave.

Fig 2. Draw the attention of the person who has come in to the fact that he has left his work station without permission.

Fig 3. Continue the conversation without reacting to the statement.

Fig 4. Indicate to the guests that what has happened is a clear example of the difficulties one encounters when introducing new organization of the work.

Situation 3

Some new equipment has been installed in your section. During the process of its adjustment it has become clear that it is only part of the installation and that it is impossible to place all of it in your section. The management hopes that you, the foremen, will save the day. How do you justify the hopes of the management?

Fig 1. Suggest locating the installation in some place where there is the necessary production space.

Fig 2. Criticize the workers who have allowed such a blunder.

Fig 3. Suggest locating the rest of the components of the installation in my office.

Fig 4. Prove that it is possible to work without the rest of the components.

Situation 4

In a conclusion of the commission on technical safety which has investigated your section measures are recommended which must be carried out within 3 days in order to eliminate the shortcomings that have been noted. Yet it is clear to you that it is practically impossible to do this within this time period. What would you do?

Fig 1. Do everything possible in order to carry out the work within the time period.

Fig 2. Carry out some of the measures.

Fig 3. Take the day off when the report time comes.

Fig 4. Devote the time that has been allotted to developing an annual plan for measures for technical security.

Situation 5

A subordinate has asked you, the foreman of a production section, to help him to formulate an efficiency proposal which promises a great savings of labor and materials.

How do you respond to the subordinate?

Fig 1. I would say that it would take a lot of my time.

Fig 2. I would explain that it is not enough to formulate a proposal, it is necessary to "push it through."

Fig 3. I would prove that what he has done is only part of the problem that was set and that he could not do it alone.

Fig 4. I would become the co-author of this suggestion.

Situation 6

While on a business trip your boss has suggested that you replace him at a responsible conference which will be held by the director of the enterprise. During the course of the conference serious criticism has been made against your boss.

How would you act in such a situation?

Fig 1. In my speech I would note that a person should be criticized when he is present.

Fig 2. I would join in on the critical remarks and add to them.

Fig 3. I would not speak.

Fig 4. I would speak after the conference.

Verification of the Substantiation of the Solutions

Situation 1

Fig 1. Practice shows that such a decision is not very effective.

Fig 2. He could hardly draw the correct conclusions from your words.

Fig 3. An acceptable solution which requires, however, a solid argument.

Fig 4. The optimal solution.

Situation 2

Fig 1. In principle this is permissible but, of course, not the optimal solution.

Fig 2. A more substantiated solution which includes an educational function.

Fig 3. This solution can be recommended to foremen with strong nerves.

Fig 4. A profound and attractive solution.

Situation 3

Fig 1. No, no, no. Nobody will allow anybody to remove equipment that has just been installed.

Fig 2. This solution will not do either. The train, as they say, has already left.

Fig 3. Not a bad variant. They will not use your office and there is probably not enough space in it anyway. But they will value your offer.

Fig 4. This is precisely what should be done.

Situation 4

Fig 1. A weak solution. You already know that all of the measures cannot be carried out in this period of time.

Fig 2. This is not the solution either. People are punished for such "solutions."

Fig 3. A partial solution to the problem. In fact, if you were not at work on that day or on the next day, they would probably do without you. But there is still a risk.

Fig 4. Excellent: just the plan. And the minimum for the year. With a large number of people for coordination and approval.

Situation 5

Fig 1. What kind of a solution is that? It is not clear.

Fig 2. Again you are not convincing. Your idea has been interrupted.

Fig 3. Now your idea has been expressed more completely. But still does it not seem to you that it is wrong to leave the final decision to subordinates?

Fig 4. Simple and clear. Good!

Situation 6

Fig 1. And what if the criticism is justified? The solution will not do because it is not universal.

Fig 2. Such a solution can be far-sighted, but also perhaps mistaken.

Fig 3. A good decision, speaking of boldness. But still....

Fig 4. This decision is stronger than the preceding one, especially if it is carried out in the absence of listeners.

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MATERIALS BEING PREPARED FOR NEXT ISSUE

Novosibirsk EKONOMIKA I ORGANIZATSIYA PROMYSHLENNOGO PROIZVODSTVA (EKO) in Russian No 11, Nov 84 p 190

[Text] An article by Academician N. P. Fedorenko, "Planning and Management: How Should They Be?" in which he raises questions of the utilization of main reserves for intensification of the economy which are in the sphere of management of the national economy.

A recording of a conversation in the Novosibirsk "Club of Directors" which was organized within the framework of the scientific and technical society. The meeting was devoted to the first results of the All-Union Economic Experiment in expanding the economic independence of enterprises and increasing their responsibility for the results of production. Participating in the discussion were managers of industrial enterprises of Novosibirsk, scientists and economists.

Under the heading "Crucial Problems of Economic Theory," the article by Dr of Economic Sciences Ye. G. Yasin, "Public Property, Economic Stimuli and Cost-Accounting." The author analyzes the weakness of economic and other stimuli and reveals factors which impede utilizing them in keeping with the principles of socialist property.

Articles on the functional-value method which is becoming more and widespread. The FSA method is inseparably related to processes of the modern scientific and technical revolution and is also a powerful stimulus for innovations in science and technology. In the selection of articles by Dr of Economic Sciences S. A. Kheyman, "An Important Source of Increased Effectiveness" and General Director of the Vatra Production Association (Ternopol) R. Yu. Yaremchuk, "FSA as a Method of Managing the Economy of an Enterprise," and articles on the application of the FSA method in machine building for light and the food industry.

A selection of materials on management consulting. Recently Estonian consultants were visited by a group of specialists from the international consulting firm Habberstadt--one of the largest in Europe. In the meeting in Tallinn they discussed problems of practical improvement of consulting activity and making it more professional. At the request of EKO, the director of the planning and design bureau for control systems of the Estonian SSR

Ministry of Light Industry, Candidate of Economic Sciences Yu. Pyarnits, deputy director of the bureau, Candidate of Economic Sciences Ya. Leymann and the vice president of the Habberstadt consulting firm, Dr M. Lagerkvist discussed the possible ways of developing consulting activity.

An article by A. S. Kolesnikov and V. V. Starovit, "Incentives for Important Inventions"--about the work of state agencies which provide expert evaluations for inventions in the USSR.

Materials under the heading "Economies of Developed Capitalist Countries," "Among Books," "Reader and Magazine," and "Brief Magazine Information."

An index of articles published in the magazines throughout the course of the year.

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